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UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA

ENTROPIC COMMUNICATIONS, LLC,

Plaintiff,

v.

~~DIRECTV, LLC; AT&T, INC.; AT&T
SERVICES, INC.; AND AT&T
COMMUNICATIONS, LLC;~~

DISH NETWORK CORPORATION, et
al.,

Defendants.

Case No. _____

Case No.: 2:23-cv-01043-JWH-KES
(Lead Case)

Case No. 2:23-cv-05253-JWH-KES
(Member Case)

~~ORIGINAL~~ FIRST AMENDED
**COMPLAINT FOR PATENT
INFRINGEMENT**

1 ENTROPIC COMMUNICATIONS, LLC,

2 Plaintiff,

3 v.

4 DIRECTV, LLC, et al.,

5 Defendants.

1 Plaintiff, Entropic Communications, LLC (“Entropic”), files this complaint for
2 patent infringement against DIRECTV, LLC (“the DIRECTV defendants”), ~~AT&T,~~
3 ~~Inc., and~~ AT&T Services, Inc., ~~and AT&T Communications, LLC~~ (the defendants
4 are collectively referred to as “DIRECTV”), and in support thereof alleges as follows:

5 1. Around the turn of the millennium, cable and satellite providers were
6 eager to deploy new and improved services, but they faced a big problem. The
7 providers needed a high-speed data network inside buildings to deliver those services
8 to various rooms. With existing technology, this meant installing new cabling inside
9 each premises to carry the network. Aside from the costly materials themselves,
10 technicians would be forced to spend hours planning the work, cutting and drilling
11 into walls, and fishing cables throughout a building, all while doing so in ways
12 customers might tolerate. The costs would run into the billions of dollars.

13 2. A group of inventors had a vision: what if they could repurpose the
14 already-existing coaxial cables common in buildings to do the job? The challenges
15 were daunting. Existing coaxial cabling was never intended to work this way. The
16 mess of existing coax topologies in homes and businesses was a formidable barrier.
17 The splitter devices used to distribute legacy TV obstructed signals from room-to-
18 room. Making it all work would require nothing less than the invention of a new
19 networking architecture founded upon a host of new technologies.

20 3. They succeeded. The inventors’ company, called Entropic
21 Communications Inc. (“Entropic Inc.”), made the technology work. The company
22 was awarded a portfolio of patents for the advances that made it possible. And the
23 company spearheaded forming a new industry standard for the architecture,
24 commonly called Multimedia over Coax Alliance standards (the “MoCA” standards).

25 4. Today, MoCA is the backbone of data and entertainment services for
26 tens of millions of customers. MoCA is widely used by every major provider in the
27 industry, saving them billions of dollars in costs and avoiding the hassle of re-wiring
28

1 for providers and customers alike. Unfortunately, the defendants take advantage of
2 MoCA without paying appropriate licensing fees for the technology. This lawsuit is
3 about redressing that wrong.

4 5. This is a civil action arising under the patent laws of the United States,
5 35 U.S.C. § 1 *et seq.*, including specifically 35 U.S.C. § 271, based on the defendants'
6 infringement of U.S. Patent Nos. 7,295,518 (the "'518 Patent"), 7,594,249 (the "'249
7 Patent") ~~(together the "Network Patents");~~ U.S. Patent Nos. 7,889,759 (the "'759
8 Patent"), 8,085,802 (the "'802 Patent") ~~(together the "Node Admission Patents");~~
9 U.S. Patent Nos. 9,838,213 (the "'213 Patent"), 10,432,422 (the "'422 Patent")
10 ~~(together the "PQoS Flows Patents");~~ U.S. Patent Nos. 8,631,450 (the "'450 Patent"),
11 8,621,539 (the "'539 Patent") ~~(together the "Link Maintenance Patents");~~ U.S. Patent
12 No. 8,320,566 (the "'0,566 Patent" or the "OFDMA Patent"); U.S. Patent No.
13 10,257,566 (the "'7,566 Patent" or the "Network Coordinator Patent"); U.S. Patent
14 No. 8,228,910 (the "'910 Patent" or the "Packet Aggregation Patent"); U.S. Patent
15 No. 8,363,681 (the "'681 Patent" or the "Clock Sync Patent") (collectively all of the
16 patents are referred to herein as the "Patents-in-Suit" or "Asserted Patents"). These
17 patents incorporate various elements of technology set forth in the ~~Multimedia over~~
18 ~~Coax Alliance~~ MoCA standards ~~(the "MoCA" standards)~~⁺.

19 THE PARTIES

20 6. Entropic is a Delaware limited liability company with an office at 7150
21 Preston Road, Suite 300, Plano, Texas 75024.

22 7. Entropic is the owner by assignment to all right, title, and interest to the
23 Patents-in-Suit. Entropic is the successor-in-interest for the Patents-in-Suit.

24 8. The DIRECTV defendants have as their registered agent in California,
25 CT Corporation System, 330 N. Brand Blvd., Suite 700, Glendale, California 91023.

26
27 ⁺ ~~Each version of the MoCA standards is referred to herein as "MoCA 1.0," "MoCA~~
28 ~~1.1," and "MoCA 2.0."~~

1 ~~9. AT&T Services, Inc. and AT&T Communications, LLC are wholly owned~~
2 ~~by AT&T, Inc. (collectively “AT&T”).~~

3 ~~10. AT&T, Inc. is a corporation organized and existing under the laws of the~~
4 ~~State of Delaware with a principal place of business at 208 S. Akard St., Dallas, Texas~~
5 ~~75202.~~

6 9. ~~11.~~ AT&T Services, Inc. is a Delaware corporation with a place of
7 business at 208 South Akard Street, Dallas, Texas 75202.

8 ~~12. AT&T Communications, LLC is a Delaware limited liability company~~
9 ~~with a place of business at 208 South Akard Street, Dallas, Texas 75202.~~

10 10. ~~13.~~ As further alleged herein, this Court has personal jurisdiction over
11 DIRECTV, and venue is proper in this Judicial District.

12 **PRESUIT DISCUSSIONS AND DIRECTV’S KNOWLEDGE OF THE**
13 **ASSERTED PATENTS**

14 ~~14. Prior to filing this Complaint, Entropic contacted DIRECTV numerous~~
15 ~~times in an attempt to reach a license agreement with DIRECTV regarding Entropic’s~~
16 ~~patent portfolio, including discussions aimed at the field of technology standardized~~
17 ~~by the MoCA. For example: Entropic sent a communication by electronic means to~~
18 ~~DIRECTV on March 9, 2022, including the Patents in Suit. On December 23, 2022~~
19 ~~and January 2, 2023, Entropic sent DIRECTV another communication by both~~
20 ~~physical and electronic means regarding a separate license to Entropic’s patents for~~
21 ~~the field of the standardized networking technology commonly called MoCA, and~~
22 ~~also seeking to discuss with DIRECTV a typical non-disclosure agreement in order~~
23 ~~to share such information. The parties subsequently entered a non-disclosure~~
24 ~~agreement to permit licensing discussions. However, as of now DIRECTV has not~~
25 ~~taken a license to any patent owned by Entropic, including the Patents in Suit.~~

26 ~~15. DIRECTV has been aware since no later than February 17, 2023 of~~
27 ~~DIRECTV’s infringement by the deployment of MoCA standardized technology of~~
28

1 ~~numerous Entropic patents, including the Asserted Patents. For example, in early~~
2 ~~February 2023, Entropic provided DIRECTV copies of claim charts illustrating~~
3 ~~DIRECTV's patent infringement of each Asserted Patent by virtue of DIRECTV's~~
4 ~~deployment of MoCA technology.~~

5 **HISTORY OF TELEVISION NETWORKING TECHNOLOGY AND**
6 **THE STATE OF THE ART AS OF THE EARLY 2000s**

7 11. Cable television in the United States traces its origins back to the late
8 1940s. At that time, the existing method for delivering TV signals was over-the-air
9 broadcast in which content was transmitted as radio waves from a TV station to TV
10 antennas. However, homes in mountain valleys, such as in Eastern Pennsylvania, had
11 poor reception of broadcast TV signals. To solve this problem, mountaintop antennas
12 were used to receive the signals, and then cabling was installed to connect the homes
13 to those mountaintop antennas. This method proved to be effective and reliable, and
14 cable television took off in popularity in the decades that followed, expanding far
15 beyond its original application and leaving the mountain valleys to become a
16 ubiquitous feature of TV distribution nationwide.

17 12. At its core, a cable system centers around a "head-end," a facility for
18 distributing television signals to subscribers' homes. These signals would be carried
19 over coaxial cable or, more recently, a combination of fiber optic and coaxial cables,
20 which allow for transmission over long distances with little signal loss or
21 interference. Coaxial cables owned by the cable provider run to a point of entry at
22 the user's premises, where the cable provider's coaxial network connects to the on-
23 premises coaxial network; the signal from the cable provider are distributed
24 throughout the premises via the on-premises coaxial network.

25 13. In the 1970s, satellite television was developed. A conventional setup
26 for satellite service was "direct-to-home" distribution. With direct-to-home service,
27 television signals are transmitted from an uplink facility to satellites, which transmit
28

1 the signals to an outdoor unit installed on a home or multi-dwelling unit. The outdoor
2 unit has a receiver and an antenna that focuses the satellite signals onto the receiver.
3 The outdoor receiver in turn distributes the satellite signals to devices on the premises
4 through, for instance, installed conventional coaxial cabling.

5 14. As of the early 2000s, coaxial cabling was connected to over 300 million
6 television sets in the United States. At that time, coaxial cabling connections were
7 the preferred in-on-premises video distribution medium for over 90 million cable and
8 satellite homes in the United States.

9 ///

10 15. As of the early 2000s, and in the decades prior, many homes in the
11 United States had multiple devices that received cable or satellite service over coaxial
12 cabling.

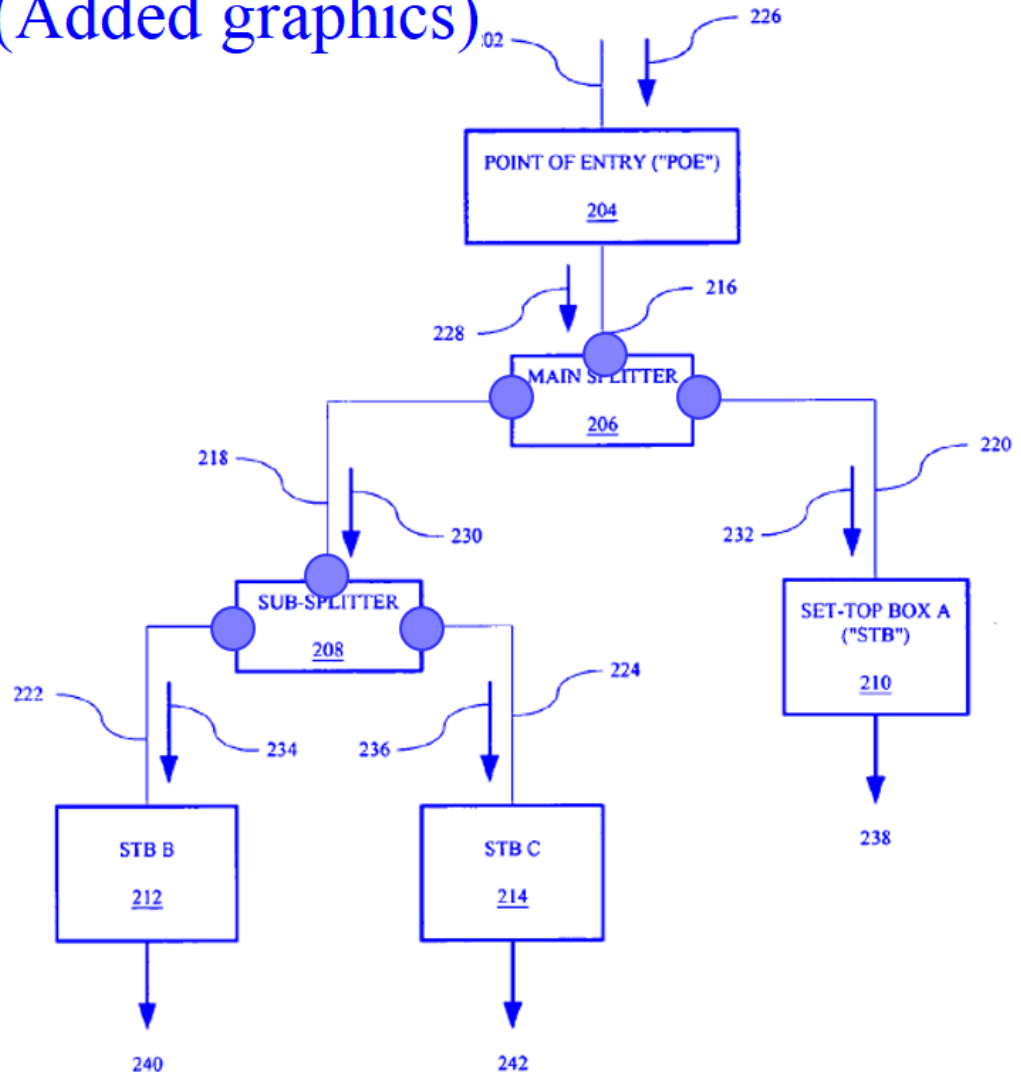
13 16. In a home or building with multiple devices connected to coaxial
14 cabling, it was standard to use splitters to distribute the signal received from outside
15 the premises to the multiple on-premises devices, such as multiple TVs or digital
16 video recorders, and to connect those devices back to the source.

17 17. Conventional splitters typically have a single input, also known as a
18 common port. The splitter splits the input signal into multiple outputs, also known as
19 tap ports. Coaxial cable extending from these ports could connect to devices in the
20 home and/or to yet another splitter (or splitters) before the signal finally reached the
21 devices.

22 18. As used herein, the terms “conventional coaxial network” or
23 “conventional on-premises coaxial network” refers to the legacy coaxial cable
24 installation that was used as of the early 2000s to distribute programming, such as
25 television content, to consumer devices on premises, such as a home, office, or
26 apartment building.

1 19. An exemplary architecture of a conventional coaxial network in the
2 early 2000s is depicted below in an annotated version of Fig. 2 of the '450 Patent.
3 Here, programming from a provider's network enters the premises at the point of
4 entry. From the point of entry, coaxial cabling is used to connect each device to the
5 provider's network. These connections are made using a series of splitters to connect
6 each device with the source of programming. In the exemplary architecture below,
7 there are three devices connected to the provider's network (Set-Top Boxes A, B,
8 and C) through coaxial cabling and multiple splitters. For the connections on the
9 splitters, input ports are marked in blue, with output ports marked in red:

(Added graphics)



20. An architecture network similar to that shown in Paragraph 18 could also be used with satellite systems, with appropriate technical variations. Signals could be received by a point of entry to the premises and then distributed throughout the premises through coaxial cabling and a series of splitters.

21. The conventional coaxial network architecture was configured to support transmission from a source outside of the premises, such as a cable head-end, to devices on the premises, such as a set-top box. Thus, the splitters were configured to optimize transmission from the source to an endpoint.

1 22. Among other things, in a conventional coaxial network architecture,
2 splitters were designed to isolate the output ports from one another. In other words,
3 the splitters were designed such that a signal being sent from the device towards the
4 source of programming would not “couple” to the other output ports of the splitter.
5 Rather, the splitters were designed to attenuate the passage of any signals between
6 output ports. This was done to reduce interference in the communication channel
7 between the source of programming and an individual device.

8 23. Although this configuration helped facilitate communication from a
9 programming source to a user’s device, it impeded communication between devices.
10 The conventional wisdom in the field as of the early 2000s, and for many years prior,
11 was that the structure of conventional coaxial networks, including the isolation of
12 end devices from each other, and the unknown and variable composition of the
13 physical network, prevented devices on the same conventional coaxial network from
14 communicating with one another across the output ports of the splitter.

15 24. As a consequence of the isolation of the output ports and the attenuation
16 of signals crossing between them, it was not well-known or routine to transmit signals
17 between different devices that were connected to the output ports of a conventional
18 coaxial network.

19 25. In fact, in the conventional coaxial networks of the early 2000s, there
20 was no mechanism, let alone a well-known one, for devices in a home or other
21 premises to communicate with one another at all. Thus, while each consumer device
22 in a home or premises could receive programming from a source outside of the home
23 or premises, there existed no well-known path or method for them to communicate
24 with one another.

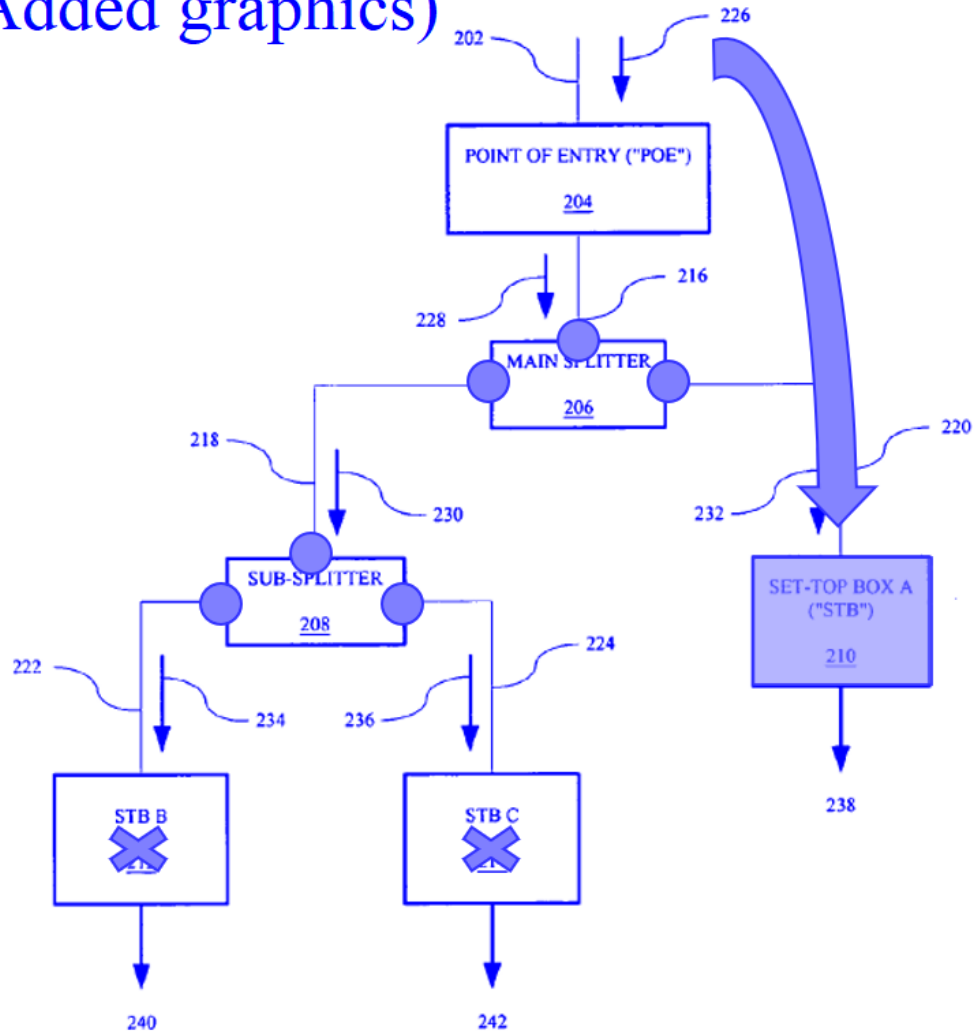
25 26. Just as there was no well-known mechanism for end devices in the home
26 to communicate with each other over conventional coaxial networks in the early
27 2000s, there was also no well-known mechanism for those devices to locate one
28

1 another or become aware of each other's existence. For instance, there was no
2 "discovery" or "admission" process that allowed devices within the home to admit a
3 new device to such an environment. Thus, while each consumer device in a home or
4 building could establish a connection with a source of programming from outside the
5 building, there existed no well-known method for those devices to do so with respect
6 to one another.

7 27. An illustration of the capabilities of a conventional coaxial network as
8 of the early 2000s is depicted below using the exemplary architecture shown in
9 Paragraph 18. As shown below, a device connected to the conventional coaxial
10 networks of the early 2000s (as an example, Set-Top Box A marked in blue) could
11 communicate with the source of programming (also marked in blue). But that device
12 would not communicate through the conventional coaxial network with any other
13 device, such as Set-Top Boxes B or C, as indicated by the red X's:

14 **ENTROPIC'S LEGACY AS AN INNOVATOR**

(Added graphics)



28. On-premises networks used for satellite TV were similarly limited. A device connected to a satellite receiver via on-premises coaxial cabling could receive programming from a source, but would not communicate through a conventional coaxial network with other devices connected to that network.

29. Further, as noted above, the communication paths between different devices on a coaxial network have different characteristics. This could be due to, for instance, the number of splitters along the communication path, the attenuation characteristics of the splitter(s), the length or quality of the coaxial cable along the path, and so on.

1 30. Further still, the characteristics of the paths can differ between the
2 upstream and downstream paths between the same two devices. This is because the
3 channel paths are not necessarily symmetrical and instead may have different
4 properties depending on the direction of signals sent between the devices. For
5 instance, the types of splitters used in conventional coaxial installations altered the
6 properties of signals being sent towards the end devices in a very different way than
7 they did for signals being sent away from them.

8 31. For instance, in the illustration shown in Paragraph 27, the
9 communication path from Set-Top Box A to Set-Top Box B (which has two splitters
10 between them) could have different properties than the communication path from the
11 Set-Top Box B to Set-Top Box C (which passes through only one splitter). So, too,
12 could the characteristics of the path from Set-Top Box A to Set-Top Box B differ
13 from the characteristics of the path from Set-Top Box B back to Set-Top Box A.

14 32. These differences in channel characteristics posed yet another
15 technological barrier to communication between devices in a home over a coaxial
16 network. In particular, these characteristics made it difficult to determine the
17 appropriate modulation scheme or other parameters that would allow two or more
18 devices connected to a conventional coaxial network to communicate with one
19 another.

20 33. Around this same time in the early 2000s, digital video recording
21 (“DVR”) technology was introduced. This technology allowed devices to record
22 television programming for later playback.

23 34. The introduction of DVR technology created demand for the ability to
24 record content on one device and transmit it to another device in the same home.

25 35. As of the early 2000s, companies like Microsoft and Hewlett-Packard
26 sold dedicated equipment that could stream content from an “Entertainment Center”
27 to a “Media Extender” Within a home or building. But these options were cost-
28

1 prohibitive for the vast majority of consumers. They also required a networking
2 infrastructure that very few consumers had in their homes at the time, such as
3 Ethernet cabling throughout the home or a high-speed wireless network that could
4 handle video streaming.

5 36. In contrast, on-premises coaxial cabling had the benefit of being pre-
6 installed in tens of millions of homes, but it did not support the transmission of
7 content from one device to another.

8 37. The technological limitations of coaxial networks were understood as of
9 the early 2000s to pose substantial barriers to meeting the demand for transmitting
10 content between devices in a home. For instance, the limitations of coaxial networks
11 in the early 2000s meant that video recorded on one device could not be streamed to
12 another device in the same home even though both devices were connected to the
13 same conventional coaxial network.

14 38. In sum, the conventional coaxial network of the early 2000s was built
15 to facilitate “vertical” communication between the source of programming and a
16 particular consumer device. But as a consequence, it was not configured for, and in
17 many ways impeded or prevented, “horizontal” communication between devices
18 connected to the conventional coaxial network in a consumer’s home.

19 ///

20 ///

21 **ENTROPIC INC. IS FOUNDED TO OVERCOME THE LIMITATIONS OF**
22 **CONVENTIONAL COAXIAL NETWORKS**

23 39. 16. Entropic Inc., the predecessor-in-interest to Entropic as to the
24 Patents-in-Suit, was founded in San Diego, California in 2001 by Dr. Anton Monk,
25 Itzhak Gurantz, Ladd El Wardani, and others. ~~Entropic Inc. was exclusively~~
26 ~~responsible for the development of the initial versions of the MoCA standards,~~
27 ~~including MoCA 1.0, ratified in 2006, MoCA 1.1, ratified in 2007, and was~~
28

~~instrumental in the development of MoCA 2.0, ratified in 2010. It also developed Direct Broadcast Satellite (“DBS”) Outdoor Unit (“ODU”) single-wire technology, and System-on-Chip (“SoC”) solutions for set-top boxes (STBs) in the home television and home video markets.~~

~~17. Under the technical guidance of Dr. Monk, Entropic Inc. grew to be publicly listed on the NASDAQ in 2007. After the public listing, the company acquired RF Magic, Inc. in 2007, a company specializing in DBS-ODU technology and related hardware.~~

~~18. Additional growth between 2007 and 2015 bolstered the technical expertise of Entropic Inc. with respect to signal acquisition, stacking, filtering, processing, and distribution for STBs and cable modems.~~

40. Entropic Inc. set out to solve the problems with conventional coaxial networks described in Paragraphs 11 through 38 above.

41. Entropic Inc. tackled the problem and managed what was considered technologically forbiddingly difficult, if not impossible: high-speed point-to-point digital communication using existing coaxial installations. This required substantial inventive effort that is embodied by the claimed inventions of the Patents-in-Suit.

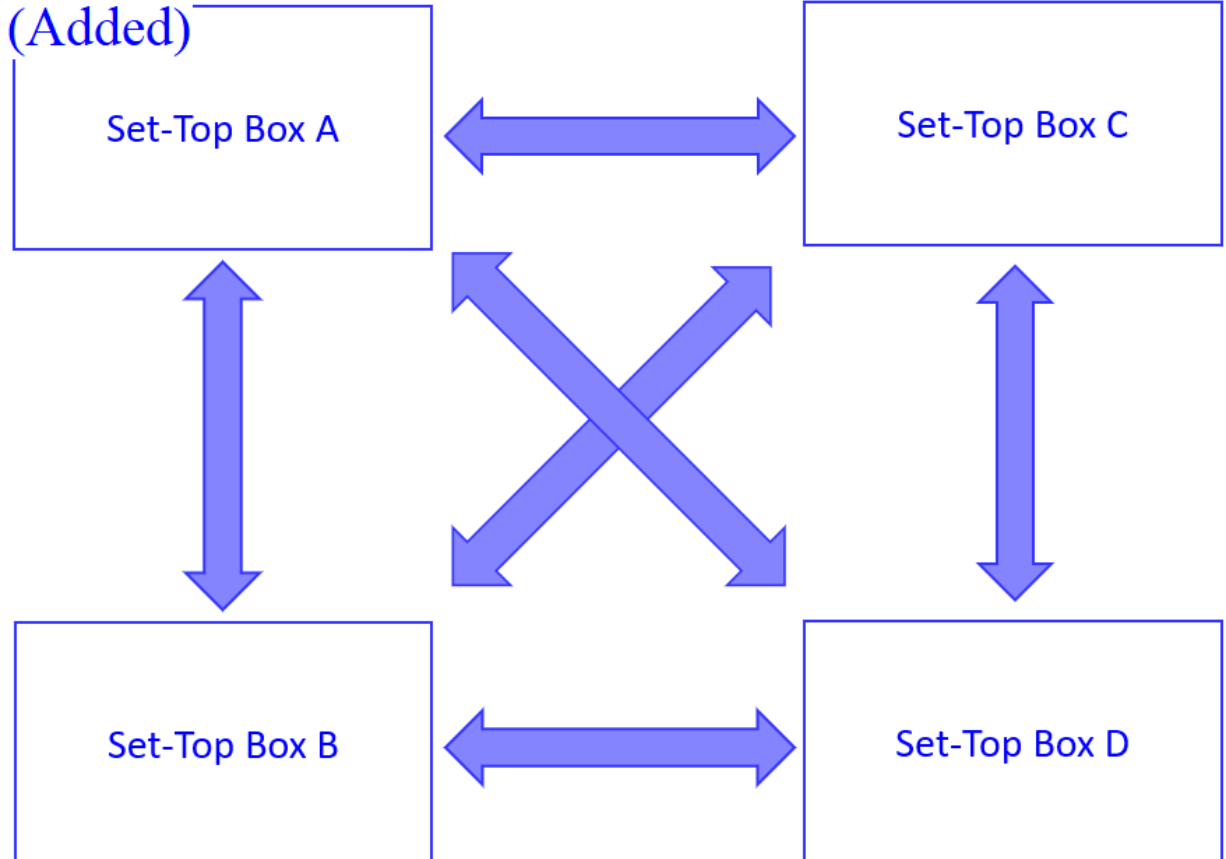
42. Entropic Inc.’s innovations, as embodied in the claimed inventions of the Patents-in-Suit, transformed coaxial networking technology by allowing for an on-premises network to be established over existing on-premises coaxial cabling.

43. Among other applications, Entropic Inc.’s new technology allowed devices in the home to transmit content to one another over the existing coaxial cables.

44. Entropic Inc.’s innovations, as embodied in the claimed inventions of the Patents-in-Suit, allowed a new type of logical network to exist on a physical structure—the conventional coaxial network—that was not designed to allow such a logical network to exist.

1 45. Prior to Entropic Inc.’s innovations, the logical architecture of
2 conventional coaxial networks was limited to a “top-down” model. This meant that
3 a source of programming could transmit content to each of the individual devices
4 connected to a conventional coaxial network, but the individual devices could not
5 transmit content to one another. This limitation was a consequence of the
6 technological limitations of the components of the coaxial network at the time, such
7 as the characteristics of the splitters used.

8 46. With Entropic Inc.’s innovations, as embodied in the claimed inventions
9 of the Patents-in-Suit, an entirely new networking model became possible for
10 communication over existing on-premises coaxial cabling. Now the conventional
11 coaxial network could operate in a point-to-point or “mesh” fashion, creating new
12 communication paths that did not exist before. The logical communication model
13 thus enabled is illustrated below, using an example of a network that has four set-top
14 boxes connected to a coaxial network (note that the arrows below represent logical



connections between devices, rather than physical links; the underlying coaxial cable topology remains unchanged from the conventional installations discussed above):

47. As explained in more detail below, each of the claimed inventions of the Patents-in-Suit contributed to this transformation in coaxial networking technology.

48. 19. For~~Over~~the years that followed, Entropic Inc. pioneered innovative networking technologies, as well as television and internet related technologies. These technologies simplified or eliminated the need for installation ~~required of new~~ equipment to support wideband reception of multiple channels for demodulation, ~~improved home~~improve internet performance, and enabled more efficient and responsive remote troubleshooting and ~~upstream~~ signal management for cable providers. These innovations represented significant advances in the field, simplified the implementation of those advances, and reduced expenses for providers and customers alike.

~~20. In 2015, MaxLinear, Inc. (“MaxLinear”)—a leading provider of radio-frequency, analog, digital, and mixed-signal semiconductor solutions—acquired Entropic Inc., and the pioneering intellectual property developed by Dr. Monk and his team.~~

~~21. In 2021, Plaintiff Entropic was established and MaxLinear transferred to Entropic a portfolio of intellectual property representing the Entropic and MaxLinear innovation in the cable and satellite services markets.~~

49. Entropic Inc. received multiple awards, recognition, and praise for its early innovative work that transformed the types of communication that were possible over coaxial cable networks. These awards and recognition include:

- In 2003, the “Breakthrough Innovation in Communications” Award from the T Sector San Diego;
- In 2004, the “Most Innovative New Product” Award for Telecommunications (17th Annual CONNECT Awards);

- 1 • In 2004, the first annual “Innovator in Telecommunications” Award
- 2 from the San Diego Telecom Council;
- 3 • In 2004, a finalist for the “Startup of the Year” Award from EDN
- 4 Magazine;
- 5 • In 2005, a finalist for the “Innovation of the Year” Award from EDN
- 6 Magazine.

7 **MOCA® AND THE MOCA® STANDARDS**

8 50. At the same time Entropic Inc. was inventing a new networking
9 architecture for coaxial networks, it also founded an organization to standardize the
10 new networking architecture it had invented and to promote its use. This became
11 known as the Multimedia over Coax Alliance, or “MoCA.”

12 51. 22. MoCA is an alliance of companies that operate in the field of
13 technology associated with providing multimedia services, such as television
14 operators, consumer electronics manufacturers, semiconductor vendors, and original
15 equipment manufacturers (OEMs). MoCA has developed and published a standard
16 governing the operation of devices using existing coaxial cable.

17 ~~23. By the year 2000, cable and satellite providers were facing the problem of~~
18 ~~distributing services as data between the various locations in a dwelling where~~
19 ~~desired by customers. This would require a full digital network, capable of~~
20 ~~communication between any node in the network, in any direction. Traditional~~
21 ~~computer networking such as Ethernet provided some of the functionality, but the~~
22 ~~cabling necessary for Ethernet or the like was (and is) very expensive to install.~~

23 ~~24. At the time, millions of dwellings and businesses across the United States~~
24 ~~often already had existing coaxial cable (“coax”) deployed throughout the premises~~
25 ~~to provide traditional television programming services to various rooms. However,~~
26 ~~this cabling was not designed or envisaged as a two-way and point-to-point network,~~
27 ~~nor a network capable of carrying high speed digital data traffic. The coax was~~
28

1 ~~deployed as a “tree” topology which simply splits the signal coming from an external~~
2 ~~source (the cable or satellite feed) for distribution of video content to the various~~
3 ~~locations on the premises in the “downlink” direction only. Thus, it was impossible~~
4 ~~to simply use this existing cable to make the new point-to-point high-quality network~~
5 ~~connections between devices located on the premises desired by the cable and~~
6 ~~satellite providers.~~

7 25. ~~Entropic Inc. tackled the problem and managed what was considered~~
8 ~~unlikely or impossible—to make a high-speed point-to-point digital communication~~
9 ~~network using existing coax installations. This required substantial inventive effort~~
10 ~~that is embodied by the Patents in Suit. For example, one of the significant~~
11 ~~challenges faced by Entropic Inc. was the varying nature of the exact topology of~~
12 ~~existing on-premises coax infrastructure that a network architecture would have to~~
13 ~~handle. The topology and types of devices (such as passive or active splitters, their~~
14 ~~characteristics, etc.) greatly influence the environment for signals transferred from~~
15 ~~node to node.~~

16 52. 26. ~~Entropic Inc. later founded an organization to standardize the~~
17 ~~networking architecture and promote its use. This became known as the Multimedia~~
18 ~~over Coax Alliance, or “MoCA.” That~~The MoCA ~~acronym has also come into~~
19 ~~common usage as the name given to the networking architecture itself—that Entropic~~
20 ~~Inc. had invented,~~ now embodied in the MoCA technical standards. documents
21 promulgated by MoCA.

22 53. ~~The technology defined in the MoCA standards enables the point-to-~~
23 ~~point high-quality network so badly needed by~~communication that met a long-felt
24 need in the ~~cable and satellite~~ provider television industries. Crucially, it also
25 provides the operators the ability to deploy ~~their~~cutting-edge services that require
26 transmitting content between end devices without the enormously costly effort of
27 installing Ethernet or similar cabling to carry the data.
28

1 ~~27. There have been several iterations of the MoCA standards, beginning with~~
2 ~~MoCA 1.0, which was ratified in 2006. Since 2006, MoCA has ratified subsequent~~
3 ~~versions of the MoCA standards, including MoCA 1.1 and MoCA 2.0.~~

4 54. Entropic Inc. was exclusively responsible for the development of the
5 initial version of the MoCA standards, including MoCA 1.0, ratified in 2006.

6 55. ~~28.~~ The MoCA standards ensure network robustness along with inherent
7 low packet error rate performance and very low latency that is relatively independent
8 of network load. The logical network model of the MoCA network is significantly
9 different from the underlying on-premises legacy coaxial network. For example, due
10 to the effects of splitter jumping and reflections, the channel characteristics for a link
11 between two MoCA nodes may be dramatically different from a link between any
12 other two MoCA nodes.

13 ~~29. The Asserted Patents address the very technological advances set forth in~~
14 ~~the MoCA standards. The Network Patents (the '518 and '249 Patents) and the~~
15 ~~OFDMA Patent (the '0,566 Patent) describe MoCA networks, including how data~~
16 ~~communicated via MoCA networks is modulated by full-mesh pre-equalization~~
17 ~~techniques known as Adaptive Constellation Multitone (ACMT), a form of OFDM~~
18 ~~modulation.~~

19 ~~30. As described in the Network Coordinator Patent (the '7,566 Patent) and~~
20 ~~the Node Admission Patents (the '759 and '802 Patents), a particular MoCA node,~~
21 ~~known as a Network Coordinator, controls the admission of nodes to the MoCA~~
22 ~~Network. The Network Coordinator sends out a variety of data packets using a~~
23 ~~modulation profile that all the MoCA nodes can receive. For broadcast and multicast~~
24 ~~transmissions, a broadcast bitloading profile can be calculated and used for each node~~
25 ~~receiving the transmissions in the MoCA network.~~

26 ~~31. MoCA nodes use a modulation profile for every point-to-point link. A~~
27 ~~variety of probe messages are transmitted by the MoCA nodes and used to create~~
28

1 ~~modulation profiles, optimize performance, and allow for various calibration~~
2 ~~mechanisms. In order to maintain network performance as network conditions~~
3 ~~change, the MoCA standards define techniques to maintain optimized point-to-point~~
4 ~~and broadcast links between all of the MoCA nodes. The **Link Maintenance Patents**~~
5 ~~(the '450 and '539 Patents) describe link maintenance operations involving the~~
6 ~~processing of probe messages at regular intervals to recalculate parameters such as~~
7 ~~modulation profile and transmit power.~~

8 32. ~~This MoCA network allows for devices (MoCA nodes) connected to a~~
9 ~~MoCA network to communicate data formatted in a variety of formats. The **Packet**~~
10 ~~**Aggregation Patent (the '910 Patent)**, for example, describes the communication~~
11 ~~of data packets in an Ethernet format, via the on-premises coaxial network without~~
12 ~~the need to deploy a separate physical network on the premises.~~

13 33. ~~The **Clock Sync Patent (the '681 Patent)** describes the synchronization~~
14 ~~of the clocks of each MoCA node in the network with a master clock provided by the~~
15 ~~Network Coordinator as these transmissions are fully coordinated.~~

16 34. ~~The MoCA standards and the **PQoS Flow Patents (the '213 and '422**~~
17 ~~**Patents)** describe how particular MoCA nodes can request additional network~~
18 ~~resources and/or transmission opportunities. This allows the MoCA node to transfer~~
19 ~~data more quickly across the MoCA network by borrowing resources that have been~~
20 ~~scheduled to other MoCA nodes.~~

21 56. ~~35. These~~The technological developments embodied in the MoCA
22 standard enable users to avoid the significant costs associated with rewiring their
23 home or business in order to ~~deploy a number of~~allow high speed point-to-point to
24 communication between devices throughout the premises. Further, these
25 technological developments allow services requiring reliable, high-speed data and
26 video communications between devices on a home network to be provided to the user
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28

1 while utilizing the on-premises coaxial ~~network~~cabling already present in the user's
2 home or business.

3 57. Entropic Inc. spearheaded MoCA, and its founders are the inventors of
4 several patents—including each of the Patents-in-Suit—that cover various
5 mandatory aspects of the MoCA standards.

6 ~~58. 36. Entropic Inc. spearheaded MoCA, and its founders are the inventors~~
7 ~~of several patents that cover various mandatory aspects of the MoCA standards. In~~
8 ~~other words, by~~By conforming to the MoCA standards, a product necessarily
9 practices those patents, either by itself, as a part of a MoCA-compliant system, or in
10 the method in which it operates.

11 **ENTROPIC INC.'S EARLY INVENTIONS ARE DIRECTED TO SOLVING**
12 **TECHNOLOGICAL PROBLEMS IN COAXIAL NETWORKS**

13 59. Several of the Patents-in-Suit claim priority to dates between 2001 to
14 2004. These include the '518 Patent, the '249 Patent, the '759 Patent, the '802 Patent,
15 the '539 Patent, and the '450 Patent.

16 60. Each of these Patents-in-Suit, as described below, claims a
17 technological solution to a problem arising in the context of enabling packet-based,
18 point-to-point networking over installed coaxial cable infrastructure in homes or
19 buildings, as of the early 2000s.

20 61. The technology claimed in each of these Patents-in-Suit solves specific
21 technological problems inherent in transforming the topology of existing coaxial
22 networks to enable point-to-point communication between devices in a customer's
23 home.

24 62. Each of these Patents-in-Suit claims activities that whether viewed alone
25 or in combination were not routine or conventional in existing on-premises coaxial
26 networks as of the date the patents were filed.

1 63. The '518 Patent. Claim 1 of the '518 Patent recites a data
2 communication network comprising:

3 at least two network devices, each network device comprising a multi-
4 carrier modulator for modulating data, an up converter for
5 translating the modulated data to an RF carrier frequency, a down
6 converter for translating an RF signal, and a multi-carrier
7 demodulator for demodulating the translated RF signal to produce
8 data; and

9 ///

10 cable wiring comprising a splitter with a common port and a plurality
11 of tap ports, and a plurality of segments of coaxial cable connecting
12 between the splitter tap ports and the network devices;

13 whereby network devices communicate with each other through the
14 cable wiring using multi-carrier signaling;

15 wherein network devices transmit probe messages through the cable
16 wiring and analyze received probe message signals to determine
17 channel characteristics and bit loading is selected based on the
18 determined channel characteristics.

19 64. Claim 1 of the '518 Patent is directed to enabling communication
20 between devices that are connected to the tap (output) ports of a coaxial splitter. This
21 type of communication has since been referred to as “splitter jumping” or “jumping
22 the splitter.”

23 65. Claim 1 of the '518 Patent recites a solution to the technological hurdles
24 associated with “splitter jumping.”

25 66. Claim 1 of the '518 Patent recites the use of probe messages to
26 determine channel characteristics and bit loading for communication between
27 network devices connected to a splitter. These recited activities improve the
28

1 functionality of coaxial networking technology. In particular, these recited activities
2 overcome the problems with conventional coaxial networks, where communication
3 paths between devices were impeded by the isolation between splitter ports and the
4 high variance in channel characteristics between those devices.

5 67. Prior to the invention of the '518 Patent, communication between
6 devices that are connected to the output ports of a coaxial splitter (splitter jumping)
7 faced numerous technological hurdles, and was not routine, conventional, or well-
8 known, as explained in Paragraphs 11 to 38 above.

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11 68. Prior to the invention of the '518 Patent, splitter jumping in a coaxial
12 network for the purpose of high bandwidth communications between devices in a
13 home, such as streaming of video, was not routine, conventional, or well-known.

14 69. Prior to the invention of the '518 Patent, it was not a routine,
15 conventional, or well-known activity to determine the characteristics of the
16 communication channels between devices in a home coaxial network.

17 70. The invention of the '518 Patent enabled a new type of communication
18 over coaxial networks that was not routine, conventional, or well-known. It achieved
19 this innovation by improving the technology that had been installed in millions of
20 homes across this United States for years, but which no one had previously been able
21 to improve in the same way.

22 71. The element of “cable wiring comprising a splitter with a common port
23 and a plurality of tap ports, and a plurality of segments of coaxial cable connecting
24 between the splitter tap ports and the network devices” recites a particular
25 technological environment, namely a coaxial network within a home with devices
26 connected by a splitter.

1 72. As described in Paragraphs 11 to 38 above, the conventional coaxial
2 network had unique technological limitations as of the priority date of the '518 Patent
3 that made horizontal communication between devices (splitter jumping) difficult and
4 impractical. In particular, the isolation between output ports and attenuation of the
5 signals crossing between them posed a technological barrier to this type of
6 communication.

7 73. Claim 1 of the '518 Patent recites multiple elements that were not
8 routine or conventional activity in the particular technological environment of
9 existing on-premises coaxial networks as of the priority date of the '518 Patent.

10 74. The element of “whereby network devices communicate with each other
11 through the cable wiring using multi-carrier signaling” recites a technological
12 capability that was not routine or conventional as of the priority date of the '518
13 Patent. As of that date, communication between network devices connected to the
14 tap ports of a splitter in a coaxial network (splitter jumping) was not a routine or well-
15 known activity for the reasons explained in Paragraphs 11 to 38 above.

16 75. The element of “wherein network devices transmit probe messages
17 through the cable wiring and analyze received probe message signals to determine
18 channel characteristics and bit loading is selected based on the determined channel
19 characteristics” recites a technological capability that was not routine or conventional
20 as of the priority date of the '518 Patent for the reasons explained in Paragraphs 11
21 to 38 above.

22 76. As of the priority date of the '518 Patent, network devices connected to
23 the tap ports of a splitter in a conventional coaxial network did not send or receive
24 signals to one another. Sending signals of any kind between such devices was not a
25 routine or well-known activity in this type of network for the reasons explained in
26 Paragraphs 11 to 38 above.

1 77. As of the priority date of the '518 Patent, network devices connected to
2 the tap ports of a splitter did not send or receive probe messages to one another.
3 Sending probe messages between devices connected to the tap ports of a splitter in a
4 conventional coaxial network was not a routine or well-known activity as of that date
5 for the reasons explained in Paragraphs 11 to 38 above.

6 78. As of the priority date of the '518 Patent, network devices connected to
7 the tap ports of a splitter in a conventional coaxial network did not determine the
8 characteristics of the communication channel between them. Characterizing the
9 communication channel between two devices in such a network was not a routine or
10 well-known activity as of that date for the reasons explained in Paragraphs 11 to 38
11 above.

12 79. As of the priority date of the '518 Patent, it was not routine or
13 conventional to combine (1) communicating between devices connected to the tap
14 ports of a splitter in a coaxial network; (2) sending and receiving probe messages
15 between those devices using the coaxial network; and (3) determining the
16 characteristics of the channel between them.

17 80. **The '249 Patent.** Claim 10 of the '249 Patent recites a broadband local
18 area network for transmitting modulated signals using coaxial cable building wiring
19 containing a plurality of branches comprising:

20 a filter located at the point of entry of the building wiring that rejects
21 network signals originating in the building wiring such that the rejected
22 network signals do not pass through the filter, but rather are reflected
23 by the filter back into all branches of the building wiring;

24 at least one signal splitter;

25 a plurality of terminal devices connected to the wiring branches, each
26 terminal device capable of communicating with other terminal devices
27 the reflected signal path created by the filter, wherein the terminal
28

1 devices perform equalization on the received signal that restores a flat
2 frequency response to overcome communication channel impairments
3 caused by the reflected signals.

4 81. Claim 10 of the '249 Patent is directed to enabling communication
5 between devices that are connected to a broadband local area network using coaxial
6 cabling.

7 82. Claim 10 of the '249 Patent recites a solution to the technological
8 hurdles associated with “splitter jumping.” Claim 10 of the '249 Patent recites the
9 use of a filter at the point of entry to a building as part of a coaxial network that
10 includes a splitter. Claim 10 of the '249 Patent further recites communication
11 between devices within the building using a reflected signal path created by the filter
12 and using equalization to overcome communication channel impairments caused by
13 the reflected signals.

14 83. These recited activities improve the functionality of conventional
15 coaxial networking technology. In particular, these recited activities overcome the
16 problems with conventional coaxial networks, where communication paths between
17 devices were impeded by the isolation between splitter ports and the high variance in
18 channel characteristics between those devices.

19 84. Prior to the invention of the '249 Patent, it was not routine,
20 conventional, or well-known in conventional coaxial networks to use a filter that
21 rejects signals and reflects them, building back into the branches of the building
22 wiring.

23 85. Prior to the invention of the '249 Patent, communication between
24 devices using a reflected signal path in a conventional coaxial network was not
25 routine, conventional, or well-known.

1 86. Prior to the invention of the '249 Patent, communication between
2 devices in a conventional coaxial network that includes a signal splitter was not
3 routine, conventional, or well-known.

4 87. Prior to the invention of the '249 Patent, performing equalization on a
5 received signal to overcome channel impairments caused by reflected signals in a
6 conventional coaxial network was not routine, conventional, or well-known.

7 88. The element of “a plurality of terminal devices connected to the wiring
8 branches, each terminal device capable of communicating with other terminal
9 devices the reflected signal path created by the filter” recites a technological
10 capability that was not routine or conventional as of the priority date of the '249
11 Patent for the reasons explained in Paragraphs 11 to 38 above.

12 89. As of the priority date of the '249 Patent, it was not routine or
13 conventional to combine (1) a filter located at the point of entry of a building to reflect
14 signals back through all branches of coaxial wiring; (2) a signal splitter; (3) a plurality
15 of terminal devices connected to the wiring branches that are capable of
16 communicating with other terminal devices through the reflected signal path created
17 by the filter; and (4) terminal devices performing equalization on the received signal
18 to overcome communication channel impairments caused by the reflected signal.

19 90. **The '759 Patent.** Claim 1 recites a method for determining a common
20 bit-loading modulation scheme for communicating between a plurality of nodes in a
21 broadband cable network (“BCN”), the method comprising:

22 transmitting a probe signal from a transmitting node within the plurality
23 of nodes to a sub-plurality of receiving nodes within the plurality of
24 nodes;

25 receiving a plurality of response signals from the sub-plurality of
26 receiving nodes wherein each response signal includes a bit-loading
27 modulation scheme determined by a corresponding receiving node; and
28

1 determining the common bit-loading modulation scheme from the
2 received plurality of response signals;
3 receiving the probe signal at one receiving node of the plurality of
4 receiving nodes through a channel path of transmission;
5 determining the transmission characteristics of the channel path at the
6 one receiving node; and
7 transmitting a response signal from the one receiving node to the
8 transmitting node,
9 wherein the transmission characteristics of the channel path are
10 determined by measuring the signal-to-noise (“SNR”) characteristics of
11 the received probe signal at the one receiving node and
12 wherein determining a common bit-loading modulation scheme
13 includes:

14 comparing a plurality of bit-loading modulation schemes from
15 the corresponding received plurality of response signals; and
16 determining the common bit-loading modulation scheme in
17 response to comparing the plurality of bit-loaded modulation
18 schemes.

19 ///

20 91. Claim 1 is directed to solving a technological problem in the field of
21 broadband cable networks. In particular, conventional broadband cable networks at
22 the time were used for transmission of programming in a “top-down” fashion to
23 devices in a home or other building. These conventional broadband cable networks
24 did not facilitate transmission of data from one device to another device on the
25 network, let alone from one device to multiple devices simultaneously on the
26 network.

1 92. Claim 1 is directed to a point-to-point topology, where each device in a
2 network communicates with the other devices in that network in a direct and non-
3 hierarchical fashion. As of the priority date of the '759 Patent, this network topology
4 was not routine, conventional, or well-known in the field of conventional coaxial or
5 broadband cable networks for the reasons explained in Paragraphs 11 to 38 above.

6 93. Claim 1 improves the technology of broadband cable networking by
7 enabling devices to communicate using broadcast transmissions that are customized
8 for the characteristics of the communication paths in that network.

9 94. At the time of the invention of the '759 Patent, it was not routine,
10 conventional, or well-known in the art for devices connected to a conventional
11 broadband cable network in the home or other premises to operate as nodes that could
12 send data to, and receive data from, other nodes on that network.

13 95. At the time of the invention of the '759 Patent, it was not routine,
14 conventional, or well-known in the art for a device connected to a conventional
15 broadband cable network to send probes to, or receive probes from another device on
16 that network.

17 96. At the time of the invention of the '759 Patent, it was not routine,
18 conventional, or well-known in the art for devices connected to a broadband cable
19 network to determine characteristics of the channel path between them.

20 97. At the time of the invention of the '759 Patent, it was not routine,
21 conventional, or well-known in the art for devices connected to a broadband cable
22 network to communicate with another simultaneously through the use of broadcast
23 transmissions.

24 98. At the time of the invention of the '759 Patent, it was not known in the
25 art that when transmitting data over a broadband cable network from one node to
26 multiple nodes it is generally more efficient to broadcast data over a common bit-
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1 loading scheme than to transmit data to each receiving node using a bit-loading
2 scheme specific to each individual communication path.

3 99. The '802 Patent. Claim 3 of the '802 Patent recites a method for
4 transmitting packets from a Broadband Cable Network ("BCN") modem to a
5 plurality of nodes in a broadband cable network, the method comprising:

6 formatting the packets in a MAC subsystem that transmits the packets within
7 the broadband cable network, including formatting a data and control
8 packet for transmission within the broadband cable network, the data and
9 control packet having a header and a variable length payload, the header
10 having at least five fields selected from the group consisting of a transmit
11 clock field, packet type field, packet subtype field, version field, source
12 node ID field, destination node ID field, and header check sequence field;

13 receiving the packets from the MAC subsystem at a Modem subsystem that is
14 in signal communication with the MAC subsystem and that appends
15 information to the packets; and

16 upconverting the packets with the information for transmission via the
17 broadband cable network at a RF subsystem that is in signal communication
18 with the Modem subsystem;

19 wherein at least one of the packets is a beacon packet that has a channel number
20 field, change field, sequence number field, network coordinator ID field,
21 next beacon index field, admission frame length field, admission window,
22 asynchronous MAP length field and a beacon Cyclic Redundancy
23 Checking (CRC) field.

24 100. Claim 3 of the '802 Patent improves the technology of broadband cable
25 networking by enabling data connections between a BCN modem and nodes of a
26 broadband cable network directly over the existing coaxial cable with its current
27 architecture, without the need to modify the existing cable infrastructure. The
28

1 claimed methodology is used in a process that has since been referred to as “node
2 admission,” during which a BCN modem forms initial connections to, and becomes
3 part of, a logical point-to-point network running on a conventional coaxial data
4 network.

5 101. Claim 3 of the ’802 Patent recites unique data structures that are
6 specific, and contribute to the improvement in conventional coaxial networking
7 technology that allows a modem on a broadband cable network to communicate with
8 a plurality of other modems on that network.

9 102. In particular, claim 3 of the ’802 Patent recites use of a “source node ID
10 field,” “destination node ID field,” and a “network coordinator ID field.” Each of
11 these fields are unique to the node-to-node communication recited in claim 3 of the
12 ’802 Patent, and which are used to achieve the technological advance in broadband
13 cable networking that enabled communication between devices on the network.

14 103. Prior to the invention of the ’802 Patent, admitting a new node into an
15 conventional coaxial network that allowed high bandwidth communications between
16 devices in a home was not routine, conventional, or well-known.

17 104. Prior to the invention of the ’802 Patent, establishing optimal
18 modulation and other transmission parameters that are optimized and periodically
19 adapted to the channel between pairs of devices in a broadband cable network was
20 not routine, conventional, or well-known.

21 105. Prior to the invention of the ’802 Patent, the use of a “source node ID
22 field,” “destination node ID field,” and a “network coordinator ID field” was not
23 routine, conventional, or well-known in a broadband cable network. This is because
24 devices in a conventional broadband cable network at the time did not communicate
25 with one another and thus did not identify the source, destination, or network
26 coordinator.

1 106. The invention of the '802 Patent enabled flexibility—by allowing
2 admission of nodes—in this new type of communication over conventional coaxial
3 networks that was not routine, conventional, or well-known. It achieved this
4 innovation without requiring changes to the legacy coaxial cables or splitters that
5 were already installed in millions of homes across the United States.

6 107. The element of “transmitting packets from a Broadband Cable Network
7 (BCN) modem to a plurality of nodes in a broadband cable network” recites a
8 particular technological environment, namely a broadband cable network.

9 108. As described in Paragraphs 11 to 38 above, this broadband cable
10 network environment had unique technological limitations as of the priority date of
11 the '802 Patent that made locating nodes on the network difficult and impractical. In
12 particular, the isolation between output ports and attenuation of the signals crossing
13 between them posed a technological barrier to forming this type of connection
14 between nodes.

15 109. Claim 3 of the '802 Patent recites multiple limitations that were not a
16 routine or conventional activity in the particular technological environment of
17 broadband cable networking as of the priority date of the '802 Patent.

18 110. The element of “formatting the packets in a MAC subsystem that
19 transmits the packets within the broadband cable network, including formatting a
20 data and control packet for transmission within the broadband cable network, the data
21 and control packet having a header and a variable length payload, the header having
22 at least five fields selected from the group consisting of a transmit clock field, packet
23 type field, packet subtype field, version field, source node ID field, destination node
24 ID field, and header check sequence field” recites a technological capability that was
25 not routine or conventional as of the priority date of the '802 Patent. As of that date,
26 the transmitting of packets (including the format of those packets) between network
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1 devices connected to the tap ports of a splitter in a coaxial network was not a routine
2 or well-known activity for the reasons explained in Paragraphs 11 to 38 above.

3 111. The element of “upconverting the packets with the information for
4 transmission via the broadband cable network at a RF subsystem that is in signal
5 communication with the Modem subsystem” recites a technological capability that
6 was not routine or conventional as of the priority date of the ’802 Patent. As of that
7 date, upconverting packets so that the transmitted data is carried on RF signals at
8 frequencies higher than the range typically used by cable TV was not a routine or
9 well-known activity because as explained in Paragraphs 11 to 38 above, packet
10 communications between network devices on a home coaxial network was not
11 routine or well-known.

12 112. The element of “wherein at least one of the packets is a beacon packet
13 that has a channel number field, change field, sequence number field, network
14 coordinator ID field, next beacon index field, admission frame length field,
15 admission window, asynchronous MAP length field and a beacon Cyclic
16 Redundancy Checking (CRC) field” recites a technological capability that was not
17 routine or conventional as of the priority date of the ’802 Patent. As of that date,
18 packet communications between network devices connected to the tap ports of a
19 splitter in a coaxial network (splitter jumping)—and therefore the type and the
20 formatting of such communications packets—was not a routine or well-known
21 activity for the reasons explained in Paragraphs 11 to 38 above.

22 113. As of the priority date of the ’802 Patent, network devices connected to
23 the tap ports of a splitter in a coaxial network did not send or receive signals to one
24 another. Sending signals of any kind between such devices was not a routine or well-
25 known activity in this type of network for the reasons explained in Paragraphs 11 to
26 38 above.

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2 114. As of the priority date of the '802 Patent, network devices connected to
3 the tap ports of a splitter did not send or receive beacon messages to one another.
4 Sending beacon messages between devices connected to the tap ports of a splitter in
5 a coaxial network was not a routine or well-known activity as of that date for the
6 reasons explained in Paragraphs 11 to 38 above.

7 115. **The '450 Patent.** Claim 29 of the '450 Patent recites a broadcasting
8 method within a Broadband Coaxial Network ("BCN"), comprising:

9 a transmitting node transmitting a probe signal to a plurality of
10 receiving nodes;

11 the transmitting node receiving a plurality of response signals
12 comprising a plurality of bit-loading modulation schemes from the
13 plurality of receiving nodes, wherein each of the plurality of receiving
14 nodes

15 receives the probe signal through a corresponding channel path,
16 determines transmission characteristics of the corresponding
17 channel path,

18 determines a bit-loading modulation scheme for the
19 corresponding channel path based on the transmission
20 characteristics, and

21 transmits a response signal to the transmitting node informing
22 the transmitting node of the bit-loading modulation scheme for
23 the corresponding channel path;

24 the transmitting node comparing the plurality of bit-loading modulation
25 schemes to determine a common bit-loading modulation scheme; and

1 the transmitting node transmitting a broadcast signal relaying the
2 common bit-loading modulation scheme to the plurality of receiving
3 nodes.

4 ///

5 116. Claim 29 is directed to solving a technological problem in the field of
6 broadband coaxial networks. In particular, conventional broadband coaxial networks
7 at the time did not facilitate transmission of data from one device to another device
8 on the network, let alone from one device to multiple devices simultaneously on the
9 network.

10 117. Claim 29 recites a broadcasting method that is specific, and contributes
11 to the improvement in conventional coaxial networking technology that allows a
12 node on a broadband coaxial network to communicate efficiently with a plurality of
13 other nodes on that network.

14 118. In particular, claim 29 recites determining a “common bit-loading
15 modulation scheme” based on a “plurality of bit-loading modulation schemes”
16 determined by a plurality of receiving nodes on the network in response to probe
17 signals sent by a transmitting node. The sending of probes and determination of a
18 common bit-loading scheme is used to achieve the technological advance in
19 broadband coaxial networking that enabled efficient communication between devices
20 on the network.

21 119. Claim 29 improves the technology of conventional broadband coaxial
22 networks by enabling devices to communicate using broadcast transmissions that are
23 customized for the characteristics of the communication paths in that network.

24 120. At the time of the invention of the ’450 Patent, it was not routine,
25 conventional, or well-known in the art for devices connected to a conventional
26 broadband coaxial network in the home to operate as nodes that could send data to,
27 and receive data from other nodes on that network.

1 121. At the time of the invention of the '450 Patent, it was not routine,
2 conventional, or well-known in the art for a device connected to a conventional
3 broadband coaxial network to send probe signals to, or receive probe signals from
4 another device on that network.

5 ///

6 122. At the time of the invention of the '450 Patent, it was not routine,
7 conventional, or well-known in the art for devices connected to a conventional
8 broadband coaxial network to determine characteristics of the channel path between
9 them.

10 123. At the time of the invention of the '450 Patent, it was not routine,
11 conventional, or well-known in the art for devices connected to a conventional
12 broadband coaxial network to communicate with another simultaneously through the
13 use of broadcast transmissions.

14 124. At the time of the invention of the '450 Patent, it was not routine,
15 conventional, or well-known in the art for a device connected to a conventional
16 broadband coaxial network to relay a common bit-loading modulation scheme to
17 other devices on a coaxial network.

18 125. At the time of the invention of the '450 Patent, it was not known in the
19 art that when transmitting data over a broadband coaxial network from one node to
20 multiple nodes it is generally more efficient to broadcast data over a common bit-
21 loading scheme than to transmit data to each receiving node using a bit-loading
22 scheme specific to each individual communication path.

23 126. **The '539 Patent.** Claim 1 of the '539 Patent recites a modem for
24 communication to at least one node across at least one channel of a coaxial network,
25 the modem comprising:

26 a transmitter; and
27
28

1 a MAC layer in signal communication with the transmitter, the MAC
2 layer using at least one probe packet as an echo profile probe to measure
3 node delay spread on the network and the MAC layer optimizing the
4 preamble and cyclic prefix requirements or other parameters in
5 response to the measured node delay spread on the network;
6 wherein the transmitter communicates the at least one probe packet.

7 ///

8 127. Claim 1 is directed to solving a technological problem in the field of
9 coaxial networks. In particular, modems on a conventional coaxial network at the
10 time of the '539 Patent did not communicate with one another, and thus did not have
11 a means for measuring the delay on the network or optimizing parameters based on
12 that measurement.

13 128. Claim 1 recites the use of probes to measure network delay spread that
14 is specific, and contributes to the improvement in coaxial networking technology that
15 allows a modem on a conventional coaxial network to communicate efficiently with
16 other nodes on that network.

17 129. Claim 1 recites the use of probes to optimize communication parameters
18 that is specific, and contributes to the improvement in conventional coaxial
19 networking technology that allows a modem on a coaxial network to communicate
20 efficiently with other nodes on that network.

21 130. Claim 1 improves the communication capabilities of modems connected
22 to a coaxial network. In particular, claim 1 recites the use of an echo profile probe to
23 measure node delay spread, which conventional coaxial networks did not measure or
24 have reason to measure. Claim 1 also recites optimizing communication parameters
25 in response to the measured delay spread, which conventional coaxial networks did
26 not do or have reason to do.

1 131. At the time of the invention of the '539 Patent, it was not routine,
2 conventional, or well-known in the art for modems connected to a conventional
3 broadband cable network to communicate with another.

4 132. At the time of the invention of the '539 Patent, it was not routine,
5 conventional, or well-known in the art for modems connected to a conventional
6 broadband cable network to transmit probe packets, let alone for the specific purpose
7 of measuring node delay spread on the network.

8 133. The element of “a MAC layer in signal communication with the
9 transmitter, the MAC layer using at least one probe packet as an echo profile probe
10 to measure node delay spread on the network” recites a technological capability that
11 was not routine or conventional in existing on-premises coaxial networks as of the
12 priority date of the '539 Patent for the reasons explained in Paragraphs 11 to 38
13 above.

14 134. The element of “the MAC layer optimizing the preamble and cyclic
15 prefix requirements or other parameters in response to the measured node delay
16 spread on the network” recites a technological capability that was not routine or
17 conventional in existing on-premises coaxial networks as of the priority date of the
18 '539 Patent for the reasons explained in Paragraphs 11 to 38 above.

19 **ENTROPIC INC. CONTINUES TO INNOVATE WITH IMPROVEMENTS**
20 **TO CONVENTIONAL COAXIAL NETWORKS**

21 135. Through MoCA and the inventions of the Patents-in-Suit described in
22 Paragraphs 39 through 134 above, Entropic Inc. revolutionized the delivery of high-
23 speed data networking services to customers on existing home coaxial infrastructure.
24 For example, using MoCA, cable and satellite providers were able to link multiple
25 devices in a customer's home in a data network, allowing for a DVR device to record
26 content and stream it to another device in the home.

1 136. Now that devices in a conventional coaxial network could communicate
2 with one another due to Entropic Inc.’s inventions, a greater need arose for faster,
3 more reliable data connections to support applications such as transmitting high-
4 quality video. This became more and more apparent as customers continued to want
5 to connect more devices to their home networks.

6 137. Furthermore, Internet subscribers expected delivery of more and higher-
7 bandwidth services, including multimedia-based applications such as real-time
8 streaming of high definition (“HD”) video and entertainment. This demand for
9 higher-bandwidth services included the use of bandwidth for streaming video stored
10 on one device on a coaxial network to another device on that network in another room
11 in a subscriber’s home.

12 138. In the 2000s, system operators faced a growing challenge of supporting
13 real-time, multimedia streaming applications simultaneous with standard Internet
14 access traffic while maintaining coexistence with already existing services, such as
15 TV, within the same home network environment. Critical to effectively serving all
16 these data flows is a method to ensure that each application is guaranteed the
17 bandwidth and minimal latency necessary to provide a satisfactory user experience.

18 139. One barrier to streaming video between devices in a home over coaxial
19 network was latency in video transmission. High amounts of latency, or delay,
20 adversely affects the viewing experience. A disruption to the flow of streaming video
21 or audio can result in stuttering playback, blocky video, or a complete loss of audio,
22 which can prompt a service call from the subscriber. As a result, there was a need for
23 technical solutions that could provide quality of service (“QoS”) mechanisms to
24 control the operation of the network. These mechanisms would manage the priorities
25 of different traffic flows on the network to ensure that data was delivered in
26 accordance with the technical requirements, such as latency or throughput
27 requirements, of particular devices or applications.
28

1 140. Another challenge for streaming video between devices in a home over
2 a coaxial network was managing the demands for bandwidth made by the different
3 devices. This challenge arose in part from Entropic Inc.’s prior inventions, which
4 allowed for communications between devices over a coaxial network. In the mid-
5 2000s, there arose a need for technological solutions that could improve the operation
6 of a packet-based, point-to-point network over conventional coaxial installations,
7 such as a MoCA network, to provide bandwidth allocations to multiple devices in
8 these new network architectures that Entropic Inc. had made possible.

9 141. Another challenge for streaming video between devices in a home over
10 a coaxial network was establishing the role of a network coordinator to manage
11 bandwidth demands and quality of service. In point-to-point communication within
12 a packet-based network on conventional coaxial installations, such as that enabled by
13 the MoCA network architecture, no specific device in the home would be pre-defined
14 as the node that manages communications of all other devices on that network.

15 142. Instead, the devices would need to coordinate with one another to
16 determine dynamically, based on characteristics of the network, which device would
17 serve as a “Network Coordinator (NC) node.” Thus, the specific nature of the point-
18 to-point network architecture in question required new solutions for how the NC node
19 would operate in order to achieve the bandwidth allocation and quality of service
20 requirements that the network required.

21 143. As of the mid-2000s, it was not routine or conventional to distinguish
22 between types of data or to guarantee bandwidth for a type of data flow for data
23 transmitted over a logical point-to-point network running over a conventional coaxial
24 network architecture.

25 144. To address these new challenges brought on by its own prior innovative
26 work on coaxial networks, Entropic Inc. continued its inventive work in coaxial
27 networking after the initial development of MoCA 1.0.
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1 145. Entropic Inc. was exclusively responsible for the development of the
2 next version of the MoCA standard, MoCA 1.1, ratified in 2007.

3 146. Entropic Inc. was also instrumental in the development of MoCA 2.0,
4 ratified in 2010.

5 **ENTROPIC INC.'S LATER INVENTIONS FURTHER IMPROVED**
6 **CONVENTIONAL COAXIAL NETWORK TECHNOLOGY**

7 147. Several of the Patents-in-Suit claim priority to 2007 to 2008. These
8 Patents-in-Suit include the '213 Patent, the '422 Patent, the '0,566 Patent, and the
9 '681 Patent.

10 148. These Patents-in-Suit, described below, recite improvements in the
11 efficiency and capabilities of the logical point-to-point networks running on top of
12 conventional coaxial networking technology.

13 ///

14 149. The claimed inventions of the Patents-in-Suit below were standardized
15 in subsequent versions of the MoCA standards.

16 150. **The '213 Patent.** Claim 1 of the '213 Patent recites a communication
17 method implemented in a Network Coordinator ("NC") node of a communication
18 network of a premises, the method comprising:

19 broadcasting to a plurality of nodes of the network, a request for a guaranteed
20 quality of service flow in the network from a source node to at least one
21 egress node, the plurality of nodes of the network to which the NC node
22 broadcasts the request including at least the source node and the at least one
23 egress node;

24 receiving a first response to the request from the source node, wherein the
25 source node is the point of origin for the purposes of the guaranteed quality
26 of service flow for data to be communicated within the guaranteed quality

1 of service flow, the first response indicating whether the source node has
2 available resources to support the guaranteed quality of service flow;
3 receiving a second response to the request from the at least one egress node
4 indicating whether the at least one egress node has available resources to
5 support the guaranteed quality of service flow; and
6 if the source node and the at least one egress node have available resources to
7 support the guaranteed quality of service flow, then allocating resources for
8 the guaranteed quality of service flow;
9 if the source node and the at least one egress node do not have available
10 resources to support the guaranteed quality of service flow, then:
11 denying the guaranteed quality of service flow; and
12 if the guaranteed quality of service flow is denied based on bandwidth-
13 related reasons, then determining a maximum data rate that would
14 have resulted in a successful request for a guaranteed quality of
15 service flow, and transmitting a message comprising information
16 describing the maximum data rate that would have resulted in a
17 successful request for a guaranteed quality of service flow.

18 151. Claim 1 of the '213 Patent is directed to improving a specific networking
19 architecture where one node functions as a "Network Coordinator (NC) node" to
20 manage quality of service for a plurality of nodes on the network. The role of an NC
21 node is not generic to networks, but arises in specific point-to-point networking
22 technologies, such as MoCA.

23 152. Claim 1 of the '213 Patent improves the technology of broadband cable
24 networking by establishing and maintaining guaranteed quality of service flows in a
25 network using specific functions of the NC node. This type of QoS mechanism has
26 since been referred to as "parameterized quality of service" or "PQoS."
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1 153. Claims 3 and 4 of the '213 Patent, which depend from claim 1, recite
2 the particular technological environment of a coaxial cable-based network within a
3 home.

4 154. Prior to the invention of the '213 Patent, guaranteeing bandwidth for
5 particular data types in a network through use of an NC node was not routine,
6 conventional, or well-known.

7 155. Prior to the invention of the '213 Patent, establishing dedicated quality
8 of service flows for particular data types in a logical point-to-point network through
9 use of an NC node was not routine, conventional, or well-known.

10 156. Prior to the invention of the '213 Patent, it was not a routine,
11 conventional, or well-known activity to distinguish the types of data transmitted on
12 a logical point-to-point network through use of an NC node.

13 157. The invention of the '213 Patent enabled a new type of QoS method for
14 networks through use of an NC node that was not routine, conventional, or well-
15 known. It further improved the performance of the logical point-to-point data
16 networks formed over conventional coaxial networks.

17 ///

18 158. The elements of “a communication network of a premises,” “a plurality
19 of nodes of the network,” “a source node,” and “at least one egress node” recite a
20 particular technological environment, namely a physical communication network of
21 a premises, such as a home or office.

22 159. As described in Paragraphs 135 to 143 above, such networks faced
23 unique technological challenges as of the priority date of the '213 Patent as
24 customers' demand rose for higher-bandwidth services through their Internet
25 subscriptions. In particular, known QoS methods proved inadequate as video
26 streaming became more prevalent.

1 160. Claim 1 of the '213 Patent recites multiple elements that were not
2 routine or conventional activity in the particular technological environment of logical
3 point-to-point networks that used an NC node as of the priority date of the '213
4 Patent, including logical networks running on a conventional coaxial network.

5 161. The element of “broadcasting to a plurality of nodes of the network, a
6 request for a guaranteed quality of service flow in the network from a source node to
7 at least one egress node, the plurality of nodes of the network to which the NC node
8 broadcasts the request including at least the source node and the at least one egress
9 node” recites a technological capability that was not routine or conventional as of the
10 priority date of the '213 Patent. As of that date, initiating a guaranteed quality of
11 service flow in a logical point-to-point network running on a conventional coaxial
12 network was not a routine or well-known activity for the reasons explained in
13 Paragraphs 135 to 143 above.

14 162. The elements of “receiving a first response to the request from the
15 source node, wherein the source node is the point of origin for the purposes of the
16 guaranteed quality of service flow for data to be communicated within the guaranteed
17 quality of service flow, the first response indicating whether the source node has
18 available resources to support the guaranteed quality of service flow” “receiving a
19 second response to the request from the at least one egress node indicating whether
20 the at least one egress node has available resources to support the guaranteed quality
21 of service flow” recite technological capabilities that were not routine or
22 conventional as of the priority date of the '213 Patent. As of that date, determining
23 whether the endpoint nodes of a data flow have the available resources to guarantee
24 a quality of service flow in a logical point-to-point network was not a routine or well-
25 known activity for the reasons explained in Paragraphs 135 to 143 above.

26 163. The element of “if the source node and the at least one egress node have
27 available resources to support the guaranteed quality of service flow, then allocating
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resources for the guaranteed quality of service flow” and “if the source node and the at least one egress node do not have available resources to support the guaranteed quality of service flow, then . . . transmitting a message comprising information describing the maximum data rate that would have resulted in a successful request for a guaranteed quality of service flow” recite technological capabilities that were not routine or conventional as of the priority date of the ’213 Patent. As of that date, establishing a guaranteed quality of service flow in a logical point-to-point network if the endpoint nodes of a data flow have available resources to guarantee a particular bandwidth, or alternatively determining a maximum bandwidth, was not a routine or well-known activity for the reasons explained in Paragraphs 135 to 143 above.

164. As of the priority date of the ’213 Patent, subscribers’ on-premises communication networks were not equipped to handle the growing demand for Internet services, including multimedia applications such as video streaming. Prioritizing data flow by data type and guaranteeing bandwidth for a particular data type was not a routine or well-known activity in conventional coaxial networks for the reasons explained in Paragraphs 135 to 143 above.

165. **The ’422 Patent.** Claim 1 of the ’422 Patent recites a communication network comprising:

a requesting node;

a Network Coordinator (NC) node; and

a plurality of requested nodes,

wherein:

the requesting node is operable to, at least, communicate a first message to the NC node requesting a list comprising parameterized quality of service (PQoS) flows of the communication network; and

the NC node is operable to, at least:

receive the first message from the requesting node; and

1 in response to the received first message:

2 communicate a second message to each requested node of
3 the plurality of requested nodes, the second message
4 requesting from said each requested node a list
5 identifying PQoS flows for which said each requested
6 node is an ingress node;
7 receive, from said each requested node a respective third
8 message comprising a list identifying PQoS flows for
9 which said each requested node is an ingress node;
10 form an aggregated list of PQoS flows comprising each
11 respective list identifying PQoS flows from each
12 received third message; and
13 communicate a fourth message to at least the requesting
14 node comprising the aggregated list,
15 wherein the second message specifies a range of PQoS
16 flows being queried.

17 166. The '422 Patent is a family member of the '213 Patent, and as described
18 above, the type of QoS mechanism described in the '213 and '422 Patents has since
19 been referred to as “parameterized quality of service” or “PQoS.”

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22 167. Claim 1 of the '422 Patent is directed to evaluating the existing
23 guaranteed quality of service flows in a logical point-to-point network that uses an
24 NC node to manage QoS.

25 168. Like the '213 Patent, Claim 1 of the '422 Patent improves the
26 technology of specific network architectures by enabling PQoS through use of an NC
27 node.

1 169. As described above with respect to the '213 Patent, the invention of the
2 '422 Patent is directed to improving the technology used in networks that rely on an
3 NC node, such as a coaxial cable-based network within a home that uses MoCA
4 technology to enable communication between all nodes in the home.

5 170. As described above with respect to the '213 Patent, prior to the invention
6 of the '422 Patent, guaranteeing bandwidth for particular data types in a logical point-
7 to-point network using an NC node, such as a MoCA network, was not routine,
8 conventional, or well-known.

9 171. Prior to the invention of the '422 Patent, establishing dedicated quality
10 of service flows for particular data types in a logical point-to-point network through
11 use of an NC node was not routine, conventional, or well-known.

12 172. Prior to the invention of the '422 Patent, it was not a routine,
13 conventional, or well-known activity to distinguish the types of data transmitted
14 through a logical point-to-point network using an NC node.

15 173. The invention of the '422 Patent enabled a new type of QoS method for
16 networks using an NC node that was not routine, conventional, or well-known. It
17 further improved the performance of logical point-to-point networks formed over
18 legacy coaxial cables or splitters that were already installed in millions of homes
19 across the United States.

20 174. The elements of “a communication network,” “a requesting node,” “a
21 Network Coordinator (NC) node,” and “a plurality of requested nodes” recite a
22 particular technological environment, namely a physical communication network of
23 a premises, such as a home or office.

24 175. As described in Paragraphs 135 to 143 above, such networks faced
25 unique technological challenges as of the priority date of the '422 Patent as
26 customers' demand rose for higher-bandwidth services through their Internet
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1 subscriptions. In particular, known QoS methods proved inadequate as video
2 streaming became more prevalent.

3 176. Claim 1 of the '422 Patent recites multiple elements that were not
4 routine or conventional activity in the particular technological environment of
5 communications networks as of the priority date of the '422 Patent.

6 177. The elements of “communicate a first message to the NC node
7 requesting a list comprising PQoS flows of the communication network” and
8 “communicate a second message to each requested node of the plurality of requested
9 nodes, the second message requesting from said each requested node a list identifying
10 PQoS flows for which said each requested node is an ingress node” recite a
11 technological capability that was not routine or conventional as of the priority date
12 of the '213 Patent. As of that date, requesting a list of existing guaranteed quality of
13 service flows in a network was not a routine or well-known activity for the reasons
14 explained in Paragraphs 135 to 143 above.

15 178. The element of “receive, from said each requested node a respective
16 third message comprising a list identifying PQoS flows for which said each requested
17 node is an ingress node” recites a technological capability that was not routine or
18 conventional as of the priority date of the '213 Patent. As of that date, identifying
19 resource commitments of existing guaranteed quality of service flows of a source or
20 ingress node in a logical point-to-point network was not a routine or well-known
21 activity for the reasons explained in Paragraphs 135 to 143 above.

22 179. The element of “form an aggregated list of PQoS flows comprising each
23 respective list identifying PQoS flows from each received third message” recites a
24 technological capability that was not routine or conventional as of the priority date
25 of the '213 Patent. As of that date, identifying and aggregating resource commitments
26 of existing guaranteed quality of service flows of all source or ingress nodes in a

1 logical point-to-point network was not a routine or well-known activity for the
2 reasons explained in Paragraphs 135 to 143 above.

3 180. As of the priority date of the '422 Patent, subscribers' on-premise
4 communication networks were not equipped to handle the growing demand for
5 Internet services, including multimedia application such as video streaming.
6 Prioritizing data flow by data type and guaranteeing bandwidth for a particular data
7 type was not a routine or well-known activity in conventional coaxial networks for
8 the reasons explained in Paragraphs 135 to 143 above.

9 181. **The '0,566 Patent.** Claim 1 of the '0,566 Patent recites a method for
10 communications transmission using orthogonal frequency division multiple access
11 on a network comprising:

12 a) providing a plurality of transmitting network devices with a set of available
13 subcarriers for orthogonal frequency division multiple access;

14 b) providing a corresponding element of a pseudorandom noise sequence for
15 each subcarrier of the set of available subcarriers;

16 c) allocating a subset of the set of available subcarriers to each of the
17 transmitting network devices;

18 d) a transmitting network device of the plurality of devices mapping a packet
19 onto a plurality of used subcarriers of its allocated subset of available
20 subcarriers, wherein the step of mapping the packet comprises mapping the
21 packet onto a plurality of quadrature amplitude modulated symbols to be
22 transmitted on the used subcarriers;

23 e) the transmitting network device performing a predetermined transformation
24 on a quadrature amplitude modulated symbol using the element of the
25 pseudorandom noise sequence corresponding to the used subcarrier;

26 f) the transmitting network device transmitting the transformed symbol to a
27 receiving network device.

1 182. Claim 1 of the '0,566 Patent is directed to solving a technological
2 problem in the field of broadband coaxial networks. In particular, with the many
3 continued advancements in data communication technology in the 2000s, as
4 described above in Paragraphs 135 to 143, more and more devices were being
5 introduced into home data networks with high bandwidth communications
6 capabilities, and subscribers were expecting delivery of more and higher-bandwidth
7 services such as HD video streaming. This increase in demand presented technical
8 challenges to data networks formed on existing coaxial networks.

9 183. Claim 1 improves the performance of a coaxial communications
10 network by enabling multiple transmitting network devices to transmit under an
11 orthogonal frequency divisional multiple access ("OFDMA") scheme to a receiving
12 network device. Such a communications method enables the efficient allocation of
13 bandwidth among various communicating devices on the network.

14 184. At the time of the invention of the '0,566 Patent, employing OFDMA
15 schemes on a coaxial network was not routine, conventional, or well-known.

16 185. At the time of the invention of the '0,566 Patent, it was not a routine,
17 conventional, or well-known activity to provide, on a conventional coaxial network,
18 "a plurality of transmitting network devices with a set of available subcarriers for
19 orthogonal frequency division multiple access" and "a corresponding element of a
20 pseudorandom noise sequence for each subcarrier of the set of available subcarriers."

21 186. At the time of the invention of the '0,566 Patent, it was not a routine,
22 conventional, or well-known activity to allocate, on a conventional coaxial network,
23 "a subset of the set of available subcarriers to each of the transmitting network
24 devices."

25 187. At the time of the invention of the '0,566 Patent, it was not a routine,
26 conventional, or well-known activity for a network device on a coaxial data network
27 to "map[] a packet onto a plurality of used subcarriers of its allocated subset of
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1 available subcarriers, wherein the step of mapping the packet comprises mapping the
2 packet onto a plurality of quadrature amplitude modulated symbols to be transmitted
3 on the used subcarriers,” to “perform[] a predetermined transformation on a
4 quadrature amplitude modulated symbol using the element of the pseudorandom
5 noise sequence corresponding to the used subcarrier,” or to “transmit[] the
6 transformed symbol to a receiving network device.”

7 188. The invention of the '0,566 Patent enabled a new and more efficient data
8 communication scheme (i.e., OFMDA) over existing on-premises coaxial networks
9 that was not routine, conventional, or well-known. It achieved this innovation
10 without requiring changes to the legacy coaxial cables or splitters that were already
11 installed in millions of homes across the United States.

12 189. **The '681 Patent.** Claim 1 of the '681 Patent recites a method for
13 synchronizing a plurality of nodes on a communication network, comprising:

14 exchanging a local clock time between a first node and a second node over the
15 communication network, wherein the exchange comprises:

16 transmitting a first packet from the first node to the second node,

17 wherein the first packet includes a first packet clock time set to the

18 local clock time of the first node at transmission time, and includes

19 a scheduled arrival clock time, and

20 setting the local clock time of the second node to the first packet clock

21 time;

22 performing a ranging method between the first and second nodes based on the

23 local clock time exchanged, wherein the ranging method results in an

24 estimated propagation delay between the first and second node, and

25 wherein the ranging method comprises:

26 transmitting a second packet from the second node to the first node,

27 wherein the second packet is transmitted from the second node at the
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1 scheduled arrival clock time, and wherein the second packet is
2 received by the first node at an actual arrival clock time,
3 calculating and storing the estimated propagation delay at the first node,
4 wherein calculating the estimated propagation delay is based on the
5 scheduled arrival clock time and the actual arrival time, and
6 transmitting a third packet from the first node to the second node,
7 wherein the third packet comprises the estimated propagation delay;
8 and
9 adjusting the local clock time of either the first or second node based on the
10 estimated propagation delay, thereby resulting in a synchronized local
11 clock time between the first and second node.

12 190. Claim 1 of the '681 Patent is directed to solving a technological problem
13 in the field of broadband coaxial networks. In particular, with the many continued
14 advancements in data communication technology in the 2000s, as described above in
15 Paragraphs 135 to 143, more and more devices are being introduced into home data
16 networks with high bandwidth communications capabilities, and subscribers were
17 expecting delivery of more and higher-bandwidth services such as HD video
18 streaming. This increase in demand presented technical challenges to data networks
19 formed on existing coaxial networks.

20 191. Claim 1 of the '681 Patent recites an improvement in clock
21 synchronization that solves a problem in estimating and accounting for propagation
22 delay. The solution is directed to logical point-to-point networks, such as coaxial
23 networks using MoCA technology, that require an estimate of propagation delay in a
24 multipath environment where the propagation delay between two nodes is not known
25 in advance, can vary dynamically based on changes in the channel path
26 characteristics between them, and where the delay between two nodes in one
27 direction can differ from the delay in the opposite direction.

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2 192. At the time of the invention of the '681 Patent, it was not a routine,
3 conventional, or well-known activity to exchange, on a conventional coaxial
4 network, “a local clock time between a first node and a second node over the
5 communication network” involving “transmitting a first packet from the first node to
6 the second node, wherein the first packet includes a first packet clock time set to the
7 local clock time of the first node at transmission time, and includes a scheduled
8 arrival clock time” and “setting the local clock time of the second node to the first
9 packet clock time.”

10 193. At the time of the invention of the '681 Patent, it was not a routine,
11 conventional, or well-known activity to “perform[] a ranging method between the
12 first and second nodes based on the local clock time exchanged, wherein the ranging
13 method results in an estimated propagation delay between the first and second node”
14 involving “transmitting a second packet from the second node to the first node,
15 wherein the second packet is transmitted from the second node at the scheduled
16 arrival clock time, and wherein the second packet is received by the first node at an
17 actual arrival clock time,” “calculating and storing the estimated propagation delay
18 at the first node, wherein calculating the estimated propagation delay is based on the
19 scheduled arrival clock time and the actual arrival time,” and “transmitting a third
20 packet from the first node to the second node, wherein the third packet comprises the
21 estimated propagation delay.”

22 194. At the time of the invention of the '681 Patent, it was not a routine,
23 conventional, or well-known activity to “adjust[] the local clock time of either the
24 first or second node based on the estimated propagation delay, thereby resulting in a
25 synchronized local clock time between the first and second node.”

26 195. The invention of the '681 Patent enabled improvements to the efficiency
27 of conventional coaxial networks that were not routine, conventional, or well-known.
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1 It achieved this innovation without requiring changes to the legacy coaxial cables and
2 splitters that were already installed in millions of homes across the United States.

3 **THE ACCUSED MOCA INSTRUMENTALITIES AND**
4 **ACCUSED SERVICES**

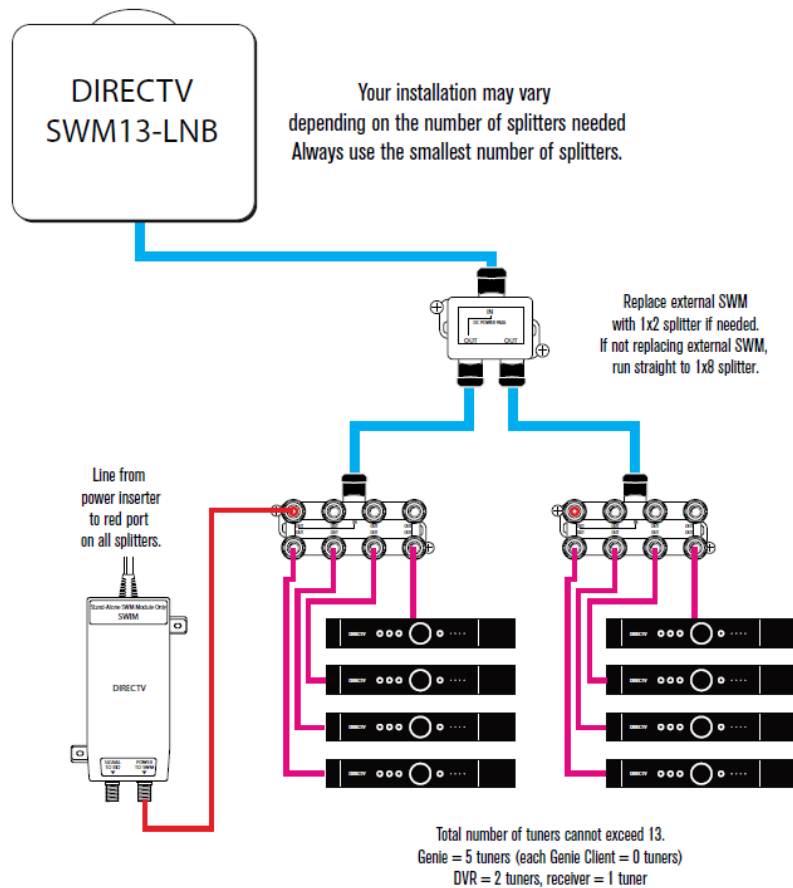
5 196. ~~37.~~ DIRECTV utilizes various instrumentalities, deployable as nodes in
6 a MoCA-compliant coaxial cable network.

7 197. ~~38.~~ DIRECTV deploys the instrumentalities to, *inter alia*, provide a
8 whole-premises DVR network over an on-premises coaxial cable network, with
9 products including DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV
10 C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44,
11 DIRECTV HR54, and DIRECTV HS17 (and devices that operate in a similar
12 manner) serving as nodes operating with data connections compliant with MoCA 1.0,
13 1.1, and/or 2.0. Such components are referred to herein as the “Accused MoCA
14 Instrumentalities.”- The MoCA-compliant services offered by DIRECTV employing
15 the Accused MoCA Instrumentalities, including the operation of a MoCA-compliant
16 network in which such instrumentalities are deployed, are referred to herein as the
17 “Accused Services.”

18 198. ~~39.~~ An exemplary illustration of the topology of various Accused MoCA
19 Instrumentalities in a DIRECTV deployment is pictured below.²¹

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27 ²¹ This is an example of the products used in the infringing network and is not
28 intended to limit the scope of products accused of infringement.

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199. ~~40.~~ Upon information and belief, the Accused MoCA Instrumentalities form networks over a coaxial cable network in accordance with the MoCA 1.0, 1.1, and/or 2.0.

200. ~~41.~~ Specifically, upon information and belief, DIRECTV instrumentalities including the DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44, DIRECTV HR54, and DIRECTV HS17 form networks over a coaxial cable network in accordance with MoCA 1.0, 1.1, and/or 2.0.

201. ~~42.~~ Most commonly, the Accused Services are offered and provided in exchange for fees paid to DIRECTV.

202. ~~43.~~ DIRECTV itself also sometimes tests and demonstrates the Accused Services, by means of Accused MoCA Instrumentalities.

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2 203. ~~44.~~ In some deployments of the Accused MoCA Instrumentalities and
3 the performance of the Accused Services, DIRECTV uses one or more of the
4 DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV C61, DIRECTV C61K,
5 DIRECTV HR24, DIRECTV HR34, DIRECTV HR44, DIRECTV HR54, and
6 DIRECTV HS17 (and devices that operate in a similar manner), to provide signals,
7 programming and content utilizing a data connection carried over a coaxial cable
8 network in accordance with the MoCA standards.

9 204. ~~45.~~ In or about January 2013 Rudy Ramirez, in his capacity as
10 DIRECTV Panamericana's senior director of product development, stated that
11 MoCA technology "will allow for simpler home network installations and home
12 topology that will allow us to provide our customers with the best entertainment
13 experience in the region."³²

14 205. ~~46.~~ Upon information and belief, Mr. Ramirez, and/or other authorized
15 DIRECTV or DIRECTV Panamericana personnel authorized the publication and
16 attribution of the preceding quote to Mr. Ramirez.

17 206. ~~47.~~ In January 2010, Romulo Pontual, in his capacity as DIRECTV's
18 chief technology officer stated, "[b]y integrating MoCA technology into our STBs
19 along with the existing deployment of Single Wire Multiswitch, we will set ourselves
20 apart from the competition as a leading provider of connected home technology."⁴³

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22
23
24 ³²[https://www.globenewswire.com/news-](https://www.globenewswire.com/news-release/2013/01/08/515194/9308/en/DIRECTV-PanAmericana-Selects-Entropic-s-Silicon-and-Software-to-Roll-Out-Advanced-TV-Viewing-Services.html)
25 [release/2013/01/08/515194/9308/en/DIRECTV-PanAmericana-Selects-Entropic-s-](https://www.globenewswire.com/news-release/2013/01/08/515194/9308/en/DIRECTV-PanAmericana-Selects-Entropic-s-Silicon-and-Software-to-Roll-Out-Advanced-TV-Viewing-Services.html)
26 [Silicon-and-Software-to-Roll-Out-Advanced-TV-Viewing-Services.html](https://www.globenewswire.com/news-release/2013/01/08/515194/9308/en/DIRECTV-PanAmericana-Selects-Entropic-s-Silicon-and-Software-to-Roll-Out-Advanced-TV-Viewing-Services.html)

27 ⁴³ [https://www.globenewswire.com/news-](https://www.globenewswire.com/news-release/2010/01/25/412869/9308/en/Entropic-Communications-Silicon-Selected-by-DIRECTV-for-Home-Networking-Deployments.html)
28 [release/2010/01/25/412869/9308/en/Entropic-Communications-Silicon-Selected-](https://www.globenewswire.com/news-release/2010/01/25/412869/9308/en/Entropic-Communications-Silicon-Selected-by-DIRECTV-for-Home-Networking-Deployments.html)
[by-DIRECTV-for-Home-Networking-Deployments.html](https://www.globenewswire.com/news-release/2010/01/25/412869/9308/en/Entropic-Communications-Silicon-Selected-by-DIRECTV-for-Home-Networking-Deployments.html)

1 207. ~~48.~~ Upon information and belief, Mr. Pontual, and/or other authorized
2 DIRECTV personnel authorized the publication and attribution of the preceding
3 quotation to Mr. Pontual.

4 ///

5 208. ~~49.~~ In or about January 2012, Mike Pulli, in his capacity as CEO of Pace
6 Americas, the manufacturer and/or supplier of DIRECTV receivers, announced that
7 MoCA was a core requirement in DIRECTV receivers.^{~~54~~}

8 209. ~~50.~~ Upon information and belief, DIRECTV required that its receivers
9 be equipped with MoCA capabilities in at least 2012.

10 210. ~~51.~~ Upon information and belief, DIRECTV continues to require that
11 certain of DIRECTV's set top boxes have MoCA capabilities.

12 211. ~~52.~~ DIRECTV was aware of its deployment and use of MoCA at least
13 as early as the later of its involvement with MoCA and six years prior to the filing of
14 this complaint.

15 212. ~~53.~~ Upon information and belief, DIRECTV was aware that Entropic
16 Inc. invented technology underlying the MoCA standards. Accordingly, such
17 Entropic Inc. technology would be incorporated into any instrumentality compliant
18 with the MoCA standards.

19 213. ~~54.~~ Upon information and belief, DIRECTV and/or its subsidiaries was
20 a member of MoCA beginning in 2012 through at least October, 2019, providing it
21 with full access to then-existing versions of the MoCA standards.

22 214. ~~55.~~ Upon information and belief, DIRECTV was aware that Entropic
23 Inc. intended to and did pursue patent protection for technology related to MoCA, at
24
25

26 ^{~~54~~} [https://www.globenewswire.com/en/news-](https://www.globenewswire.com/en/news-release/2012/01/11/465253/9308/en/Entropic-Communications-Powers-the-Pace-HR34-Home-Media-Center-HD-DVR-for-DIRECTV.html)
27 [release/2012/01/11/465253/9308/en/Entropic-Communications-Powers-the-Pace-](https://www.globenewswire.com/en/news-release/2012/01/11/465253/9308/en/Entropic-Communications-Powers-the-Pace-HR34-Home-Media-Center-HD-DVR-for-DIRECTV.html)
28 [HR34-Home-Media-Center-HD-DVR-for-DIRECTV.html](https://www.globenewswire.com/en/news-release/2012/01/11/465253/9308/en/Entropic-Communications-Powers-the-Pace-HR34-Home-Media-Center-HD-DVR-for-DIRECTV.html)

1 least as early as the later of its involvement with MoCA and the issue date of the
2 Asserted Patents.

3 215. ~~56.~~ When DIRECTV obtained, deployed and/or used instrumentalities
4 with MoCA functionality not provided by Entropic Inc., DIRECTV knew or should
5 have known that Entropic Inc. had provided no authorization for such activities, for
6 example by a patent license.

7 216. ~~57.~~ Upon information and belief, when DIRECTV obtained, deployed
8 and/or used instrumentalities with MoCA functionality not provided by Entropic Inc.,
9 DIRECTV failed to investigate whether Entropic Inc. authorized the use of Entropic
10 Inc.'s patents for such activity.

11 217. ~~58.~~ Alternatively, upon information and belief, when DIRECTV
12 obtained, deployed and/or used instrumentalities with MoCA functionality not
13 provided by Entropic Inc., DIRECTV knew the use of Entropic Inc.'s patents for
14 such activity was not authorized by Entropic Inc.

15 **ENTROPIC ACQUIRES THE PATENTS AND CONTACTS DIRECTV**
16 **ABOUT TAKING A LICENSE TO THE ASSERTED PATENTS**

17 218. Entropic Inc. achieved technological and commercial success from its
18 inventive work with coaxial networks throughout the 2000s.

19 219. In addition to its work on MoCA and the inventions that enabled it,
20 Entropic Inc. also developed Direct Broadcast Satellite ("DBS") Outdoor Unit
21 ("ODU") single-wire technology, and System-on-Chip ("SoC") solutions for set-top
22 boxes ("STBs") in the home television and home video markets.

23 220. Under the technical guidance of Dr. Monk, Entropic Inc. grew to be
24 publicly listed on the NASDAQ in 2007. After the public listing, the company
25 acquired RF Magic, Inc. in 2007, a company specializing in DBS ODU technology
26 and related hardware.

1 221. Additional growth between 2007 and 2015 bolstered the technical
2 expertise of Entropic Inc. with respect to signal acquisition, stacking, filtering,
3 processing, and distribution for STBs and cable modems.

4 222. In 2015, MaxLinear, Inc. (“MaxLinear”)—a leading provider of radio-
5 frequency, analog, digital, and mixed-signal semiconductor solutions—acquired
6 Entropic Inc., and the pioneering intellectual property developed by Dr. Monk and
7 his team.

8 ///

9 223. In 2021, Plaintiff Entropic Communications, LLC was established.

10 224. In 2021, MaxLinear transferred to Entropic a portfolio of intellectual
11 property representing the innovations of Entropic and MaxLinear in the cable and
12 satellite services markets.

13 225. Prior to filing this Complaint, Entropic contacted DIRECTV numerous
14 times in an attempt to reach a license agreement with DIRECTV regarding Entropic’s
15 patent portfolio, including discussions aimed at the field of technology standardized
16 by the MoCA.

17 226. On March 9, 2022, Entropic sent a communication by electronic means
18 to DIRECTV, including the Patents-in-Suit.

19 227. On December 23, 2022, and January 2, 2023, Entropic sent DIRECTV
20 another communication by both physical and electronic means regarding a separate
21 license to Entropic’s patents for the field of the standardized networking technology
22 commonly called MoCA, and also seeking to discuss with DIRECTV a typical non-
23 disclosure agreement in order to share such information.

24 228. The parties subsequently entered a non-disclosure agreement to permit
25 licensing discussions. However, as of now DIRECTV has not taken a license to any
26 patent owned by Entropic, including the Patents-in-Suit.

230. As of at least February 17, 2023, DIRECTV has been on notice of Entropic's assertions of infringement of the Asserted Patents.

JURISDICTION AND VENUE

///

233. ~~64.~~ This Court currently has before it another case involving the same parties that also concerns DIRECTV providing satellite television services to its customers, including those in this Judicial District. *Entropic Comm's. LLC v. DIRECTV LLC*, Case No. 2:22-cv-07775-JWH-JEM (*DIRECTV I CDCA*). That co-pending matter was transferred to this Court from the Eastern District of Texas on October 26, 2022 on motion from the DIRECTV defendants, which alleged that such matter could have been properly brought originally in this Judicial District. See *DIRECTV I CDCA*, Dkt. No. 110.

1 in this District, and have committed acts of patent infringement in this Judicial
2 District. DIRECTV has committed acts of patent infringement within the State of
3 California and in this Judicial District by making, using, selling, offering for sale,
4 and/or leasing the Accused MoCA Instrumentalities, as well as Accused Services
5 employing the Accused MoCA Instrumentalities, that comply with one or more of
6 MoCA 1.0, 1.1, and/or 2.0.

7 235. ~~63.~~ This Court has general personal jurisdiction over the DIRECTV
8 defendants because the DIRECTV defendants conduct systematic and regular
9 business within the State of California by, *inter alia* providing satellite television and
10 internet services to businesses and residents throughout this State.

11 ///

12 236. ~~64.~~ This Court has general personal jurisdiction over AT&T because
13 AT&T conducts systematic and regular business within the State of California by,
14 *inter alia* providing telephone, satellite television and internet services to businesses
15 and residents throughout this State.

16 237. ~~65.~~ The Court has specific personal jurisdiction over DIRECTV because
17 it has committed acts of infringement within the State of California and this Judicial
18 District through, for example, making infringing networks using the Accused MoCA
19 Instrumentalities, and using the Accused MoCA Instrumentalities to provide the
20 Accused Services in the State of California and this Judicial District.

21 238. ~~66.~~ DIRECTV's regular and established places of business within this
22 District are used to conduct DIRECTV's business, i.e. the development,
23 maintenance, and provision of the Accused Services and Accused MoCA
24 Instrumentalities.

25 239. ~~67.~~ DIRECTV's business in this Judicial District includes employing
26 hardware and software engineers who developed and maintain the Accused MoCA
27 Instrumentalities and related software.

1 240. ~~68.~~ Upon information and belief, DIRECTV, by itself and/or through its
2 agents offers various telecommunication services throughout the United States.
3 DIRECTV operates and maintains a nationwide television and data network through
4 which DIRECTV sells, leases, and offers for sale or lease products and services,
5 including the Accused MoCA Instrumentalities, to businesses, consumers, and
6 government agencies. DIRECTV offers to sell, sells, and provides DIRECTV
7 branded products and services, including, set top boxes and digital video, audio, and
8 other content services to customers. Subscribers to DIRECTV's television services
9 receive one or more receivers and/or set-top boxes, within this Judicial District.

10 241. ~~69.~~ Upon information and belief, AT&T, by itself and/or through its
11 agents has offered and continues to offer various "DIRECTV" branded
12 telecommunication services throughout the United States. AT&T has operated and
13 maintained a nationwide television and data network through which AT&T sold,
14 leased, offered for sale, sells, leases, and offered for sale and/or continues to do so,
15 products and services, including the Accused MoCA Instrumentalities, to businesses,
16 consumers, and government agencies. AT&T offers to sell, sells, and provides
17 DIRECTV branded products and services, including, set top boxes and digital video,
18 audio, and other content services to customers. Subscribers to the "DIRECTV"
19 branded television services receive one or more receivers and/or set-top boxes, within
20 this Judicial District.

21 242. ~~70.~~ Upon information and belief, DIRECTV provides the Accused
22 Services and Accused MoCA Instrumentalities throughout the United States and in
23 this Judicial District.

24 243. ~~71.~~ Upon information and belief, DIRECTV employs and/or contracts
25 with persons and directs them to install, service, repair, and/or replace equipment, as
26 appropriate, in this District.

13 245. ~~73.~~ DIRECTV continues to conduct business in this Judicial District,
14 including the acts and activities described in the preceding paragraph.

COUNT I

20 247. ~~75.~~ Entropic incorporates by reference each allegation of Paragraphs 1
21 through 74.

25 249. ~~77.~~ Entropic owns all substantial rights, interest, and title in and to the
26 '518 Patent, including the sole and exclusive right to prosecute this action and enforce
27 the '518 Patent against infringers, and to collect damages for all relevant times.

1 250. ~~78.~~ The '518 Patent is ~~one of the Network Patents, and is~~ generally
2 directed to, *inter alia*, broadband local area data networks using on-premises coaxial
3 cable wiring for interconnection of devices. Probe messages can be “sent between
4 devices to characterize the communication channel and determine optimum bit
5 loading” for communicating data between devices. '518 Patent, Abstract. The '518
6 Patent has four claims, of which claims 1 and 4 are independent. At least these claims
7 of the '518 Patent are directed to the creation of the MoCA network using the on-
8 premises coaxial cable wiring. A true and accurate copy of the '518 Patent is attached
9 hereto as Exhibit A.

10 251. ~~79.~~ The '518 Patent is directed to patent-eligible subject matter pursuant
11 to 35 U.S.C. § 101.

12 252. ~~80.~~ The '518 Patent is valid and enforceable, and presumed as such,
13 pursuant to 35 U.S.C. § 282.

14 253. ~~81.~~ DIRECTV deploys one or more of the Accused MoCA
15 Instrumentalities (e.g., DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV
16 C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44,
17 DIRECTV HR54, and DIRECTV HS17) in connection with operating and providing
18 the Accused Services.

19 254. ~~82.~~ The Accused MoCA Instrumentalities deployed by DIRECTV to
20 customer premises remain the property of DIRECTV while deployed.

21 255. ~~83.~~ The Accused MoCA Instrumentalities operate while deployed in a
22 manner controlled and intended by DIRECTV.

23 256. ~~84.~~ As set forth in the attached non-limiting claim chart (Exhibit B), any
24 product or system operating in a MoCA network compliant with the charted
25 provisions of MoCA 1.0, 1.1, and/or 2.0 necessarily infringes at least claim 1 of the
26 '518 Patent.

1 257. ~~85.~~ Each aspect of the functioning of the Accused MoCA
2 Instrumentalities described in the claim chart operates while deployed to customer
3 premises in a manner controlled and intended by DIRECTV.

4 258. ~~86.~~ DIRECTV provides no software, support or other facility to
5 customers to modify any aspect of the functioning described in the claim chart of the
6 Accused MoCA Instrumentalities while deployed to customer premises.

7 259. ~~87.~~ The Accused MoCA Instrumentalities are compliant with the
8 provisions of MoCA 1.0, 1.1., and/or 2.0, as described in the '518 Patent claim chart,
9 Exhibit B.

10 260. ~~88.~~ DIRECTV therefore directly infringes at least claim 1 of the '518
11 Patent by using the Accused MoCA Instrumentalities to provide Accused Services to
12 customers.

13 261. ~~89.~~ DIRECTV directly infringes at least claim 1 of the '518 Patent when
14 it, for example, uses the Accused MoCA Instrumentalities to test, demonstrate or
15 otherwise provide Accused Services.

16 262. ~~90.~~ DIRECTV directly infringes at least claim 1 of the '518 Patent by
17 making, importing, selling, and/or offering for sale the Accused MoCA
18 Instrumentalities in connection with providing the Accused Services over an
19 on-premises coaxial cable network, which meets each and every ~~limitation~~element of
20 at least claim 1 of the '518 Patent.

21 263. ~~91.~~ DIRECTV had knowledge of the '518 Patent no later than its receipt
22 of Entropic's communications sent to DIRECTV on March 9, 2022.

23 264. ~~92.~~ DIRECTV has been aware that it infringes the '518 Patent since at
24 least as early as receipt of Entropic's communications sent to DIRECTV on March
25 9, 2022.

26 265. ~~93.~~ DIRECTV has known of or has been willfully blind to the '518
27 Patent since before the March 9, 2022 communications from Entropic.
28

1 266. ~~94.~~ The '518 Patent issued while or before DIRECTV was a member of
2 MoCA.

3 267. ~~95.~~ Because of DIRECTV's knowledge of Entropic Inc.'s work and
4 contributions related to MoCA technology, DIRECTV had knowledge of the '518
5 Patent before March 9, 2022 or was willfully blind to its existence.

6 268. ~~96.~~ DIRECTV has been aware of its infringement of the '518 Patent no
7 later than February 17, 2023 when Entropic sent DIRECTV claim charts detailing
8 the infringement of the '518 Patent by MoCA technology, which is deployed by
9 DIRECTV. The claim charts DIRECTV received approximately three months before
10 the filing of this Complaint show that the claims of the '518 Patent are essential to
11 practicing at least MoCA standards versions 1.0, 1.1, and/or 2.0.

12 269. ~~97.~~ The claims of the '518 Patent are essential to practicing at least
13 MoCA standards versions 1.0, 1.1, and/or 2.0.

14 270. ~~98.~~ DIRECTV knew, or was willfully blind to the fact that the
15 technology of the '518 Patent directly relates to networking over coaxial cable,
16 including MoCA, at least as early as DIRECTV became aware of the existence of the
17 '518 Patent. Because of its familiarity with, and access to, the MoCA standards,
18 DIRECTV knew, or was willfully blind to the fact, that use (by DIRECTV or its
19 customers) of instrumentalities compliant with MoCA 1.0, 1.1, and/or 2.0 to deliver
20 DIRECTV services would necessarily infringe one or more claims of the '518 Patent.

21 271. ~~99.~~ Since learning of the '518 Patent and its infringing activities,
22 DIRECTV has failed to cease its infringing activities.

23 272. ~~100.~~ DIRECTV's customers and subscribers directly infringe at least
24 claim 1 of the '518 Patent by using the Accused MoCA Instrumentalities in
25 connection with the Accused Services provided by DIRECTV.

26 273. ~~101.~~ DIRECTV actively induces its customers' and subscribers' direct
27 infringement by providing the Accused Services and associated support.
28

1 274. ~~102.~~ For example, DIRECTV actively induces infringement of at least
2 claim 1 of the '518 Patent by providing the Accused MoCA Instrumentalities to
3 DIRECTV customers with specific instructions and/or assistance (including
4 installation and maintenance) regarding the instantiation of a MoCA network and the
5 use of the Accused MoCA Instrumentalities in a manner that infringes the '518
6 Patent.

7 275. ~~103.~~ DIRECTV aids, instructs, supports, and otherwise acts with, the
8 intent to cause an end user to make and/or use the MoCA network and/or use the
9 Accused MoCA Instrumentalities in a manner that infringes each and every element
10 of at least claim 1 of the '518 Patent.

11 276. ~~104.~~ Additionally, DIRECTV contributes to the customers' and
12 subscribers' direct infringement. DIRECTV provides at least the Accused MoCA
13 Instrumentalities that create and are at least substantially all of a MoCA network to
14 be used to infringe at least claim 1 of the '518 Patent.

15 277. ~~105.~~ The Accused MoCA Instrumentalities have no substantial
16 noninfringing uses. When an end user uses the Accused MoCA Instrumentalities in
17 connection with the Accused Services provided by DIRECTV, the end user
18 necessarily directly infringes at least claim 1 of the '518 Patent. The Accused MoCA
19 Instrumentalities are therefore especially made or especially adapted for use in an
20 infringing manner.

21 ///

22 278. ~~106.~~ DIRECTV's inducement of, and contribution to, the direct
23 infringement of at least claim 1 of the '518 Patent has been, and is, continuous and
24 ongoing through the acts described above in connection with DIRECTV's provision
25 of the Accused Services.

1 coaxial cable wiring. A true and accurate copy of the '249 Patent is attached hereto
2 as Exhibit C.

3 286. ~~114.~~ The '249 Patent is directed to patent-eligible subject matter
4 pursuant to 35 U.S.C. § 101.

5 287. ~~115.~~ The '249 Patent is valid and enforceable, and presumed as such,
6 pursuant to 35 U.S.C. § 282.

7 288. ~~116.~~ DIRECTV deploys one or more of the Accused MoCA
8 Instrumentalities (e.g., DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV
9 C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44,
10 DIRECTV HR54, and DIRECTV HS17) in connection with operating and providing
11 the Accused Services.

12 289. ~~117.~~ The Accused MoCA Instrumentalities deployed by DIRECTV to
13 customer premises remain the property of DIRECTV while deployed.

14 290. ~~118.~~ The Accused MoCA Instrumentalities operate while deployed in a
15 manner controlled and intended by DIRECTV.

16 291. ~~119.~~ As set forth in the attached non-limiting claim chart (Exhibit D),
17 any product or system operating in a MoCA network compliant with the charted
18 provisions of MoCA 1.0, 1.1, and/or 2.0 necessarily infringes at least claim 10 of the
19 '249 Patent.

20 292. ~~120.~~ Each aspect of the functioning of the Accused MoCA
21 Instrumentalities described in the claim chart operates while deployed to customer
22 premises in a manner controlled and intended by DIRECTV.

23 293. ~~121.~~ DIRECTV provides no software, support or other facility to
24 customers to modify any aspect of the functioning described in the claim chart of the
25 Accused MoCA Instrumentalities while deployed to customer premises.

26 294. ~~122.~~ The Accused MoCA Instrumentalities are compliant with MoCA
27 1.0, 1.1., and/or 2.0, as described in the '249 Patent claim chart, Exhibit D.
28

1 ///

2 295. ~~123.~~ DIRECTV therefore directly infringes at least claim 10 of the '249
3 Patent by using the Accused MoCA Instrumentalities to provide Accused Services to
4 customers.

5 296. ~~124.~~ DIRECTV directly infringes at least claim 10 of the '249 Patent
6 when it, for example, uses the Accused MoCA Instrumentalities to test, demonstrate
7 or otherwise provide Accused Services.

8 297. ~~125.~~ DIRECTV directly infringes at least claim 10 of the '249 Patent by
9 making, importing, selling, and/or offering for sale the Accused MoCA
10 Instrumentalities in connection with providing the Accused Services over an
11 on-premises coaxial cable network, which meets each and every ~~limitation~~element of
12 at least claim 10 of the '249 Patent.

13 298. ~~126.~~ DIRECTV had knowledge of the '249 Patent no later than its
14 receipt of Entropic's communications sent to DIRECTV on March 9, 2022.

15 299. ~~127.~~ DIRECTV has been aware that it infringes the '249 Patent no later
16 than its receipt of Entropic's communications sent to DIRECTV on March 9, 2022.

17 300. ~~128.~~ DIRECTV has known of or has been willfully blind to the '249
18 Patent since before the March 9, 2022 communications from Entropic.

19 301. ~~129.~~ The '249 Patent issued while or before DIRECTV was a member
20 of MoCA.

21 302. ~~130.~~ Because of DIRECTV's knowledge of Entropic Inc.'s work and
22 contributions related to MoCA technology, DIRECTV had knowledge of the '249
23 Patent before March 9, 2022 or was willfully blind to its existence.

24 303. ~~131.~~ DIRECTV has been aware of its infringement of the '249 Patent
25 no later than February 17, 2023 when Entropic sent DIRECTV claim charts detailing
26 the infringement of the '249 Patent by MoCA technology, which is deployed by
27 DIRECTV. The claim charts DIRECTV received approximately three months before
28

1 the filing of this Complaint show that the claims of the '249 Patent are essential to
2 practicing at least MoCA standards versions 1.0, 1.1, and/or 2.0.

3 304. ~~132.~~ The claims of the '249 Patent are essential to practicing at least
4 MoCA standards versions 1.0, 1.1, and/or 2.0.

5 305. ~~133.~~ DIRECTV knew, or was willfully blind to the fact that the
6 technology of the '249 Patent directly relates to networking over coaxial cable,
7 including MoCA, at least as early as DIRECTV became aware of the existence of the
8 '249 Patent. Because of its familiarity with, and access to, the MoCA standards,
9 DIRECTV knew, or was willfully blind to the fact, that use (by DIRECTV or its
10 customers) of instrumentalities compliant with MoCA 1.0, 1.1, and/or 2.0 to deliver
11 DIRECTV services would necessarily infringe one or more claims of the '249 Patent.

12 306. ~~134.~~ Since learning of the '249 Patent and its infringing activities,
13 DIRECTV has failed to cease its infringing activities.

14 307. ~~135.~~ DIRECTV's customers and subscribers directly infringe at least
15 claim 10 of the '249 Patent by using the Accused MoCA Instrumentalities in
16 connection with the Accused Services provided by DIRECTV.

17 308. ~~136.~~ DIRECTV actively induces its customers' and subscribers' direct
18 infringement by providing the Accused Services and associated support.

19 309. ~~137.~~ For example, DIRECTV actively induces infringement of at least
20 claim 10 of the '249 Patent by providing the Accused MoCA Instrumentalities to
21 DIRECTV customers with specific instructions and/or assistance (including
22 installation and maintenance) regarding the instantiation of a MoCA network and the
23 use of the Accused MoCA Instrumentalities in a manner that infringes the '249
24 Patent.

25 310. ~~138.~~ DIRECTV aids, instructs, supports, and otherwise acts with the
26 intent to cause an end user to make and/or use the MoCA network and/or use the
27
28

1 Accused MoCA Instrumentalities in a manner that infringes every element of at least
2 claim 10 of the '249 Patent.

3 311. ~~139.~~ Additionally, DIRECTV contributes to the customers' and
4 subscribers' direct infringement. DIRECTV provides at least the Accused MoCA
5 Instrumentalities that create and are at least substantially all of a MoCA network to
6 be used to infringe at least claim 10 of the '249 Patent.

7 312. ~~140.~~ The Accused MoCA Instrumentalities have no substantial
8 noninfringing uses. When an end user uses the Accused MoCA Instrumentalities in
9 connection with the Accused Services provided by DIRECTV, the end user
10 necessarily directly infringes at least claim 10 of the '249 Patent. The Accused MoCA
11 Instrumentalities are therefore especially made or especially adapted for use in an
12 infringing manner.

13 313. ~~141.~~ DIRECTV's inducement of, and contribution to, the direct
14 infringement of at least claim 10 of the '249 Patent has been, and is, continuous and
15 ongoing through the acts described above in connection with DIRECTV's provision
16 of the Accused Services.

17 314. ~~142.~~ DIRECTV's infringement of the '249 Patent is, has been, and
18 continues to be willful, intentional, deliberate, and/or in conscious disregard for
19 Entropic's rights under the patent.

20 315. ~~143.~~ Entropic has been damaged as a result of the infringing conduct
21 alleged above. DIRECTV is liable to Entropic in an amount that compensates
22 Entropic for DIRECTV's infringement, which by law cannot be less than a
23 reasonable royalty, together with interest and costs as fixed by this Court under 35
24 U.S.C. § 284.

25 316. ~~144.~~ Entropic is aware of no obligation to mark any instrumentality with
26 the '249 Patent in accordance with 35 U.S.C. § 287.

COUNT III

(Infringement of the '759 Patent)

317. ~~145.~~ Entropic incorporates by reference each allegation of Paragraphs 1 through 144.

318. ~~146.~~ The '759 Patent duly issued on February 15, 2011 from an application filed July 12, 2004, an application filed August 29, 2002, and, *inter alia* a provisional application filed August 30, 2001.

///

319. ~~147.~~ Entropic owns all substantial rights, interest, and title in and to the '759 Patent, including the sole and exclusive right to prosecute this action and enforce the '759 Patent against infringers, and to collect damages for all relevant times.

320. ~~148.~~ The '759 Patent is ~~one of the Node Admission Patents, and is~~ generally directed to, *inter alia*, broadband cable networks that allow devices to communicate directly over the existing coaxial cable with its current architecture without the need to modify the existing cable infrastructure. Each device communicates with the other devices in the network and establishes a common modulation scheme between the devices in the network. '759 Patent, Abstract. The '759 Patent has 22 claims, of which claims 1–7, 14, 20–22 are independent. At least these claims of the '759 Patent are directed to a variety of techniques for establishing a modulation scheme for communications between nodes in the MoCA network. A true and correct copy of the '759 Patent is attached hereto as Exhibit E.

321. ~~149.~~ The '759 Patent is directed to patent-eligible subject matter pursuant to 35 U.S.C. § 101.

322. ~~150.~~ The '759 Patent is valid and enforceable, and presumed as such, pursuant to 35 U.S.C. § 282.

323. ~~151.~~ DIRECTV deploys one or more of the Accused MoCA Instrumentalities (e.g., DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV

1 C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44,
2 DIRECTV HR54, and DIRECTV HS17) in connection with operating and providing
3 the Accused Services.

4 324. ~~152.~~ The Accused MoCA Instrumentalities deployed by DIRECTV to
5 customer premises remain the property of DIRECTV while deployed.

6 325. ~~153.~~ The Accused MoCA Instrumentalities operate while deployed in a
7 manner controlled and intended by DIRECTV.

8 326. ~~154.~~ As set forth in the attached non-limiting claim chart (Exhibit F),
9 any product or system operating in a MoCA network compliant with the charted
10 provisions of MoCA 1.0, 1.1, and/or 2.0 necessarily infringes at least claim 2 of the
11 '759 Patent.

12 327. ~~155.~~ Each aspect of the functioning of the Accused MoCA
13 Instrumentalities described in the claim chart operates while deployed to customer
14 premises in a manner controlled and intended by DIRECTV.

15 328. ~~156.~~ DIRECTV provides no software, support or other facility to
16 customers to modify any aspect of the functioning described in the claim chart of the
17 Accused MoCA Instrumentalities while deployed to customer premises.

18 329. ~~157.~~ The Accused MoCA Instrumentalities are compliant with MoCA
19 1.0, 1.1., and/or 2.0, as described in the '759 Patent claim chart, Exhibit F.

20 330. ~~158.~~ DIRECTV therefore directly infringes at least claim 2 of the '759
21 Patent by using the Accused MoCA Instrumentalities to provide Accused Services to
22 customers.

23 331. ~~159.~~ DIRECTV sells the Accused Services to its customers and
24 subscribers for a fee. Pursuant to the sale of these services, DIRECTV uses the
25 method recited in at least claim 2 of the '759 Patent to provide the Accused Services
26 to DIRECTV's customers and subscribers through the Accused MoCA
27 Instrumentalities. DIRECTV is therefore engaging in the infringing use of at least
28

1 claim 2 of the '759 Patent in order to generate revenue from its customers and
2 subscribers.

3 332. ~~160.~~ DIRECTV directly infringes at least claim 2 of the '759 Patent
4 when it, for example, uses the Accused MoCA Instrumentalities to test, demonstrate
5 or otherwise provide Accused Services.

6 333. ~~161.~~ DIRECTV had knowledge of the '759 Patent no later than its
7 receipt of Entropic's communications sent to DIRECTV on March 9, 2022.

8 334. ~~162.~~ DIRECTV has been aware that it infringes the '759 Patent no later
9 than its receipt of Entropic's communications sent to DIRECTV on March 9, 2022.

10 335. ~~163.~~ DIRECTV has known of or has been willfully blind to the '759
11 Patent since before the March 9, 2022 communications from Entropic.

12 336. ~~164.~~ The '759 Patent issued while or before DIRECTV was a member
13 of MoCA.

14 337. ~~165.~~ Because of DIRECTV's knowledge of Entropic Inc.'s work and
15 contributions related to MoCA technology, DIRECTV had knowledge of the '759
16 Patent before March 9, 2022 or was willfully blind to its existence.

17 338. ~~166.~~ DIRECTV has been aware of its infringement of the '759 Patent
18 no later than February 17, 2023 when Entropic sent DIRECTV claim charts detailing
19 the infringement of the '759 Patent by MoCA technology, which is deployed by
20 DIRECTV. The claim charts DIRECTV received approximately three months before
21 the filing of this Complaint show that the claims of the '759 Patent are essential to
22 practicing at least MoCA standards versions 1.0, 1.1, and/or 2.0.

23 339. ~~167.~~ The claims of the '759 Patent are essential to practicing at least
24 MoCA standards versions 1.0, 1.1, and/or 2.0.

25 340. ~~168.~~ DIRECTV knew, or was willfully blind to the fact that the
26 technology of the '759 Patent directly relates to networking over coaxial cable,
27 including MoCA, at least as early as DIRECTV became aware of the existence of the
28

1 '759 Patent. Because of its familiarity with, and access to, the MoCA standards,
2 DIRECTV knew, or was willfully blind to the fact, that use (by DIRECTV or its
3 customers) of instrumentalities compliant with MoCA 1.0, 1.1, and/or 2.0 to deliver
4 DIRECTV services would necessarily infringe one or more claims of the '759 Patent.

5 341. ~~169.~~ Since learning of the '759 Patent and its infringing activities,
6 DIRECTV has failed to cease its infringing activities.

7 342. ~~170.~~ DIRECTV's customers and subscribers directly infringe at least
8 claim 2 of the '759 Patent by using the Accused MoCA Instrumentalities in
9 connection with the Accused Services provided by DIRECTV.

10 343. ~~171.~~ DIRECTV actively induces its customers' and subscribers' direct
11 infringement by providing the Accused Services and associated support.

12 ///

13 344. ~~172.~~ For example, DIRECTV actively induces infringement of at least
14 claim 2 of the '759 Patent by providing the Accused MoCA Instrumentalities to
15 DIRECTV customers with specific instructions and/or assistance (including
16 installation and maintenance) regarding the instantiation of a MoCA network and the
17 use of the Accused MoCA Instrumentalities to infringe the '759 Patent.

18 345. ~~173.~~ DIRECTV aids, instructs, supports, and otherwise acts with the
19 intent to cause an end user to make and/or use the MoCA network and/or use the
20 Accused MoCA Instrumentalities to infringe every element of at least claim 2 of the
21 '759 Patent.

22 346. ~~174.~~ Additionally, DIRECTV contributes to the customers' and
23 subscribers' direct infringement. DIRECTV provides at least the Accused MoCA
24 Instrumentalities that create and are at least substantially all of a MoCA network to
25 be used to infringe at least claim 2 of the '759 Patent.

26 347. ~~175.~~ The Accused MoCA Instrumentalities have no substantial
27 noninfringing uses. When an end user uses the Accused MoCA Instrumentalities in
28

1 connection with the Accused Services provided by DIRECTV, the end user
2 necessarily directly infringes at least claim 2 of the '759 Patent. The Accused MoCA
3 Instrumentalities are therefore especially made or especially adapted for use in an
4 infringing manner.

5 348. ~~176.~~ DIRECTV's inducement of, and contribution to, the direct
6 infringement of at least claim 2 of the '759 Patent has been, and is, continuous and
7 ongoing through the acts described above in connection with DIRECTV's provision
8 of the Accused Services.

9 349. ~~177.~~ DIRECTV's infringement of the '759 Patent is, has been, and
10 continues to be willful, intentional, deliberate, and/or in conscious disregard for
11 Entropic's rights under the patent.

12 350. ~~178.~~ Entropic has been damaged as a result of the infringing conduct
13 alleged above. DIRECTV is liable to Entropic in an amount that compensates
14 Entropic for DIRECTV's infringement, which by law cannot be less than a
15 reasonable royalty, together with interest and costs as fixed by this Court under 35
16 U.S.C. § 284.

17 351. ~~179.~~ Upon information and belief, there is no duty to mark any
18 instrumentality with the '759 Patent in accordance with 35 U.S.C. § 287.

19 COUNT IV

20 (Infringement of the '802 Patent)

21 352. ~~180.~~ Entropic incorporates by reference each allegation of Paragraphs 1
22 through 179.

23 353. ~~181.~~ The '802 Patent duly issued on December 27, 2011 from an
24 application filed December 2, 2005 and a provisional application filed December 2,
25 2004.

1 354. ~~182.~~ Entropic owns all substantial rights, interest, and title in and to the
2 '802 Patent, including the sole and exclusive right to prosecute this action and enforce
3 the '802 Patent against infringers, and to collect damages for all relevant times.

4 355. ~~183.~~ The '802 Patent is ~~one of the Node Admission Patents, and is~~
5 generally directed to, *inter alia*, broadband cable networks that allow devices to
6 communicate directly over the existing coaxial cable with its current architecture
7 without the need to modify the existing cable infrastructure. Each device
8 communicates with the other devices in the network and establishes the best
9 modulation and other transmission parameters that is optimized and periodically
10 adapted to the channel between each pair of devices. '802 Patent, col. 4, lines 7–24.
11 The '802 Patent has four claims, all of which are independent. At least these claims
12 of the '802 Patent are directed to a variety of techniques for establishing a modulation
13 scheme for communications between nodes in the MoCA network. A true and
14 accurate copy of the '802 Patent is attached hereto as Exhibit G.

15 356. ~~184.~~ The '802 Patent is directed to patent-eligible subject matter
16 pursuant to 35 U.S.C. § 101.

17 357. ~~185.~~ The '802 Patent is valid and enforceable, and presumed as such,
18 pursuant to 35 U.S.C. § 282.

19 ///

20 358. ~~186.~~ DIRECTV deploys one or more of the Accused MoCA
21 Instrumentalities (e.g., DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV
22 C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44,
23 DIRECTV HR54, and DIRECTV HS17) in connection with operating and providing
24 the Accused Services.

25 359. ~~187.~~ The Accused MoCA Instrumentalities deployed by DIRECTV to
26 customer premises remain the property of DIRECTV while deployed.

1 360. ~~188.~~ The Accused MoCA Instrumentalities operate while deployed in a
2 manner controlled and intended by DIRECTV.

3 361. ~~189.~~ As set forth in the attached non-limiting claim chart (Exhibit H),
4 any product or system operating in a MoCA network compliant with the charted
5 provisions of MoCA 1.0, 1.1, and/or 2.0 necessarily infringes at least claim 3 of the
6 '802 Patent.

7 362. ~~190.~~ Each aspect of the functioning of the Accused MoCA
8 Instrumentalities described in the claim chart operates while deployed to customer
9 premises in a manner controlled and intended by DIRECTV.

10 363. ~~191.~~ DIRECTV provides no software, support or other facility to
11 customers to modify any aspect of the functioning described in the claim chart of the
12 Accused MoCA Instrumentalities while deployed to customer premises.

13 364. ~~192.~~ The Accused MoCA Instrumentalities are compliant with MoCA
14 1.0, 1.1., and/or 2.0, as described in the '802 Patent claim chart, Exhibit H.

15 365. ~~193.~~ DIRECTV therefore directly infringes at least claim 3 of the '802
16 Patent by using the Accused MoCA Instrumentalities to provide Accused Services to
17 customers.

18 366. ~~194.~~ DIRECTV sells the Accused Services to its customers and
19 subscribers for a fee. Pursuant to the sale of these services, DIRECTV uses the
20 method recited in at least claim 3 of the '802 Patent to provide the Accused Services
21 to DIRECTV's customers and subscribers through the Accused MoCA
22 Instrumentalities. DIRECTV is therefore engaging in the infringing use of at least
23 claim 3 of the '802 Patent in order to generate revenue from its customers and
24 subscribers.

25 367. ~~195.~~ DIRECTV directly infringes at least claim 3 of the '802 Patent
26 when it, for example, uses the Accused MoCA Instrumentalities to test, demonstrate
27 or otherwise provide Accused Services and/or the Accused MoCA Instrumentalities.
28

1 368. ~~196.~~ DIRECTV had knowledge of the '802 Patent no later than its
2 receipt of Entropic's communications sent to DIRECTV on March 9, 2022.

3 369. ~~197.~~ DIRECTV has been aware that it infringes the '802 Patent no later
4 than its receipt of Entropic's communication sent to DIRECTV on March 9, 2022.

5 370. ~~198.~~ DIRECTV has known of or has been willfully blind to the '802
6 Patent since before the March 9, 2022 communications from Entropic.

7 371. ~~199.~~ The '802 Patent issued while or before DIRECTV was a member
8 of MoCA.

9 372. ~~200.~~ Because of DIRECTV's knowledge of Entropic Inc.'s work and
10 contributions related to MoCA technology, DIRECTV had knowledge of the '802
11 Patent before March 9, 2022 or was willfully blind to its existence.

12 373. ~~201.~~ DIRECTV has been aware of its infringement of the '802 Patent
13 no later than February 17, 2023 when Entropic sent DIRECTV claim charts detailing
14 the infringement of the '802 Patent by MoCA technology, which is deployed by
15 DIRECTV. The claim charts DIRECTV received approximately three months before
16 the filing of this Complaint show that the claims of the '802 Patent are essential to
17 practicing at least MoCA standards versions 1.0, 1.1, and/or 2.0.

18 374. ~~202.~~ The claims of the '802 Patent are essential to practicing at least
19 MoCA standards versions 1.0, 1.1, and/or 2.0.

20 375. ~~203.~~ DIRECTV knew, or was willfully blind to the fact that the
21 technology of the '802 Patent directly relates to networking over coaxial cable,
22 including MoCA, at least as early as DIRECTV became aware of the existence of the
23 '802 Patent. Because of its familiarity with, and access to, the MoCA standards,
24 DIRECTV knew, or was willfully blind to the fact, that use (by DIRECTV or its
25 customers) of instrumentalities compliant with MoCA 1.0, 1.1, and/or 2.0 to deliver
26 DIRECTV services would necessarily infringe one or more claims of the '802 Patent.

1 376. ~~204.~~ Since learning of the '802 Patent and its infringing activities,
2 DIRECTV has failed to cease its infringing activities.

3 377. ~~205.~~ DIRECTV's customers and subscribers directly infringe at least
4 claim 3 of the '802 Patent by using the Accused MoCA Instrumentalities in
5 connection with the Accused Services provided by DIRECTV.

6 378. ~~206.~~ DIRECTV actively induces its customers' and subscribers' direct
7 infringement by providing the Accused Services and associated support.

8 379. ~~207.~~ For example, DIRECTV actively induces infringement of at least
9 claim 3 of the '802 Patent by providing the Accused MoCA Instrumentalities to
10 DIRECTV customers with specific instructions and/or assistance (including
11 installation and maintenance) regarding the instantiation of a MoCA network and the
12 use of the Accused MoCA Instrumentalities to infringe the '802 Patent.

13 380. ~~208.~~ DIRECTV aids, instructs, supports, and otherwise acts with the
14 intent to cause an end user to make and/or use the MoCA network and/or use the
15 Accused MoCA Instrumentalities to infringe every element of at least claim 3 of the
16 '802 Patent.

17 381. ~~209.~~ Additionally, DIRECTV contributes to the customers' and
18 subscribers' direct infringement. DIRECTV provides at least the Accused MoCA
19 Instrumentalities that create and are at least substantially all of a MoCA network to
20 be used to infringe at least claim 3 of the '802 Patent.

21 382. ~~210.~~ The Accused MoCA Instrumentalities have no substantial
22 noninfringing uses. When an end user uses the Accused MoCA Instrumentalities in
23 connection with the Accused Services provided by DIRECTV, the end user
24 necessarily directly infringes at least claim 3 of the '802 Patent. The Accused MoCA
25 Instrumentalities are therefore especially made or especially adapted for use in an
26 infringing manner.

1 without the need to modify the existing cable infrastructure. Each device
2 communicates with the other devices in the network and establishes a common
3 modulation scheme between the devices in the network. '450 Patent, col. 4, lines 12-
4 28. The '450 Patent has 38 claims, of which, claim 1, 8, 27, 29, and 34 are
5 independent. At least these claims of the '450 Patent are directed to a variety of
6 techniques for determining a common modulation scheme for communications
7 between nodes in the MoCA network. A true and accurate copy of the '450 Patent is
8 attached hereto as Exhibit I.

9 391. ~~219.~~ The '450 Patent is directed to patent-eligible subject matter
10 pursuant to 35 U.S.C. § 101.

11 392. ~~220.~~ The '450 Patent is valid and enforceable, and presumed as such,
12 pursuant to 35 U.S.C. § 282.

13 393. ~~221.~~ DIRECTV deploys one or more of the Accused MoCA
14 Instrumentalities (e.g., DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV
15 C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44,
16 DIRECTV HR54, and DIRECTV HS17) in connection with operating and providing
17 the Accused Services.

18 394. ~~222.~~ The Accused MoCA Instrumentalities deployed by DIRECTV to
19 customer premises remain the property of DIRECTV while deployed.

20 395. ~~223.~~ The Accused MoCA Instrumentalities operate while deployed in a
21 manner controlled and intended by DIRECTV.

22 396. ~~224.~~ As set forth in the attached non-limiting claim chart (Exhibit J),
23 any product or system operating in a MoCA network compliant with the charted
24 provisions of MoCA 1.0, 1.1, and/or 2.0 necessarily infringes at least claim 29 of the
25 '450 Patent.

1 397. ~~225.~~ Each aspect of the functioning of the Accused MoCA
2 Instrumentalities described in the claim chart operates while deployed to customer
3 premises in a manner controlled and intended by DIRECTV.

4 398. ~~226.~~ DIRECTV provides no software, support or other facility to
5 customers to modify any aspect of the functioning described in the claim chart of the
6 Accused MoCA Instrumentalities while deployed to customer premises.

7 ///

8 399. ~~227.~~ The Accused MoCA Instrumentalities are compliant with MoCA
9 1.0, 1.1., and/or 2.0, as described in the '450 Patent claim chart, Exhibit J.

10 400. ~~228.~~ DIRECTV therefore directly infringes at least claim 29 of the '450
11 Patent by using the Accused MoCA Instrumentalities to provide Accused Services to
12 customers.

13 401. ~~229.~~ DIRECTV sells the Accused Services to its customers and
14 subscribers for a fee. Pursuant to the sale of these services, DIRECTV uses the
15 method recited in at least claim 29 of the '450 Patent to provide the Accused Services
16 to DIRECTV's customers and subscribers through the Accused MoCA
17 Instrumentalities. DIRECTV is therefore engaging in the infringing use of at least
18 claim 29 of the '450 Patent in order to generate revenue from its customers and
19 subscribers.

20 402. ~~230.~~ DIRECTV directly infringes at least claim 29 of the '450 Patent
21 when it, for example, uses the Accused MoCA Instrumentalities to test, demonstrate
22 or otherwise provide Accused Services.

23 403. ~~231.~~ DIRECTV had knowledge of the '450 Patent no later than its
24 receipt of Entropic's communications sent to DIRECTV on March 9, 2022.

25 404. ~~232.~~ DIRECTV has been aware that it infringes the '450 Patent no later
26 than its receipt of Entropic's communication sent to DIRECTV on March 9, 2022.
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1 405. ~~233.~~ DIRECTV has known of or has been willfully blind to the '450
2 Patent since before the March 9, 2022 communications from Entropic.

3 406. ~~234.~~ The '450 Patent issued while or before DIRECTV was a member
4 of MoCA.

5 407. ~~235.~~ Because of DIRECTV's knowledge of Entropic Inc.'s work and
6 contributions related to MoCA technology, DIRECTV had knowledge of the '450
7 Patent before March 9, 2022 or was willfully blind to its existence.

8 408. ~~236.~~ DIRECTV has been aware of its infringement of the '450 Patent
9 no later than February 17, 2023 when Entropic sent DIRECTV claim charts detailing
10 the infringement of the '450 Patent by MoCA technology, which is deployed by
11 DIRECTV. The claim charts DIRECTV received approximately three months before
12 the filing of this Complaint show that the claims of the '450 Patent are essential to
13 practicing at least MoCA standards versions 1.0, 1.1, and/or 2.0.

14 409. ~~237.~~ The claims of the '450 Patent are essential to practicing at least
15 MoCA standards versions 1.0, 1.1, and/or 2.0.

16 410. ~~238.~~ DIRECTV knew, or was willfully blind to the fact that the
17 technology of the '450 Patent directly relates to networking over coaxial cable,
18 including MoCA, at least as early as DIRECTV became aware of the existence of the
19 '450 Patent. Because of its familiarity with, and access to, the MoCA standards,
20 DIRECTV knew, or was willfully blind to the fact, that use (by DIRECTV or its
21 customers) of instrumentalities compliant with MoCA 1.0, 1.1, and/or 2.0 to deliver
22 DIRECTV services would necessarily infringe one or more claims of the '450 Patent.

23 411. ~~239.~~ Since learning of the '450 Patent and its infringing activities,
24 DIRECTV has failed to cease its infringing activities.

25 412. ~~240.~~ DIRECTV's customers and subscribers directly infringe at least
26 claim 29 of the '450 Patent by using the Accused MoCA Instrumentalities in
27 connection with the Accused Services provided by DIRECTV.

1 413. ~~241.~~ DIRECTV actively induces its customers' and subscribers' direct
2 infringement by providing the Accused Services and associated support.

3 414. ~~242.~~ For example, DIRECTV actively induces infringement of at least
4 claim 29 of the '450 Patent by providing the Accused MoCA Instrumentalities to
5 DIRECTV customers with specific instructions and/or assistance (including
6 installation and maintenance) regarding the instantiation of a MoCA network and the
7 use of the Accused MoCA Instrumentalities to infringe the '450 Patent.

8 415. ~~243.~~ DIRECTV aids, instructs, supports, and otherwise acts with the
9 intent to cause an end user to make and/or use the MoCA network and/or use the
10 Accused MoCA Instrumentalities to infringe every element of at least claim 29 of the
11 '450 Patent.

12 416. ~~244.~~ Additionally, DIRECTV contributes to the customers' and
13 subscribers' direct infringement. DIRECTV provides at least the Accused MoCA
14 Instrumentalities that create and are at least substantially all of a MoCA network to
15 be used to infringe at least claim 29 of the '450 Patent.

16 417. ~~245.~~ The Accused MoCA Instrumentalities have no substantial
17 noninfringing uses. When an end user uses the Accused MoCA Instrumentalities in
18 connection with the Accused Services provided by DIRECTV, the end user directly
19 infringes at least claim 29 of the '450 Patent. The Accused MoCA Instrumentalities
20 are especially made or especially adapted for use in an infringing manner.

21 418. ~~246.~~ DIRECTV's inducement of, and contribution to, the direct
22 infringement of at least claim 29 of the '450 Patent has been, and is, continuous and
23 ongoing through the acts described above in connection with DIRECTV's provision
24 of the Accused Services.

25 419. ~~247.~~ DIRECTV's infringement of the '450 Patent is, has been, and
26 continues to be willful, intentional, deliberate, and/or in conscious disregard for
27 Entropic's rights under the patent.
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6 421. ~~249.~~ Upon information and belief, there is no duty to mark any
7 instrumentality with the '450 Patent in accordance with 35 U.S.C. § 287.

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COUNT VI

16 422. ~~250.~~ Entropic incorporates by reference each allegation of Paragraphs 1
17 through 249.

21 424. ~~252.~~ Entropic owns all substantial rights, interest, and title in and to the
22 '7,566 Patent, including the sole and exclusive right to prosecute this action and
23 enforce the '7,566 Patent against infringers, and to collect damages for all relevant
24 times.

⁵ The parties are discussing how they intend to proceed with respect to the '7,566 Patent. Entropic has included these allegations from the Original Complaint pending the result of those discussions.

1 425. ~~253.~~ The '7,566 Patent ~~is the Network Coordinator Patent, and it~~ uses
2 the claimed controller to form, manage, and optimize mesh networks over coaxial
3 cable, thereby allowing nodes to communicate efficiently with each other. ~~-~~ *Id.* at col.
4 3, lines 21-24; col. 4, lines 22-42. This invention resulted in creating the ability for
5 set top boxes to communicate with one another over coaxial cable networks. '7,566
6 Patent, col. 3, lines 39-46. The '7,566 Patent is generally directed to, *inter alia*,
7 broadband cable networks that allow devices to communicate directly over the
8 existing coaxial cable with its current architecture without the need to modify the
9 existing cable infrastructure. Each device communicates with the other devices in the
10 network and establishes the best modulation and other transmission parameters that
11 is optimized and periodically adapted to the channel between each pair of
12 devices. '7,566 Patent, col. 4, lines 23–39. The '7,566 Patent has 20 claims, of which
13 claims 1, 11, and 19 are independent. At least these claims of the '7,566 Patent are
14 directed to a variety of techniques for controlling the admission of nodes in the
15 MoCA network. A true and accurate copy of the '7,566 Patent is attached hereto as
16 Exhibit K.

17 426. ~~254.~~ The '7,566 Patent is directed to patent-eligible subject matter
18 pursuant to 35 U.S.C. § 101.

19 427. ~~255.~~ The '7,566 Patent is valid and enforceable, and presumed as such,
20 pursuant to 35 U.S.C. § 282.

21 428. ~~256.~~ DIRECTV deploys one or more of the Accused MoCA
22 Instrumentalities (e.g., DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV
23 C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44,
24 DIRECTV HR54, and DIRECTV HS17) in connection with operating and providing
25 the Accused Services.

26 429. ~~257.~~ The Accused MoCA Instrumentalities deployed by DIRECTV to
27 customer premises remain the property of DIRECTV while deployed.

1 430. ~~258.~~ The Accused MoCA Instrumentalities operate while deployed in a
2 manner controlled and intended by DIRECTV.

3 431. ~~259.~~ As set forth in the attached non-limiting claim chart (Exhibit L),
4 any product or system operating in a MoCA network compliant with the charted
5 provisions of MoCA 1.0, 1.1, and/or 2.0 necessarily infringes at least claim 11 of the
6 '7,566 Patent.

7 432. ~~260.~~ Each aspect of the functioning of the Accused MoCA
8 Instrumentalities described in the claim chart operates while deployed to customer
9 premises in a manner controlled and intended by DIRECTV.

10 433. ~~261.~~ DIRECTV provides no software, support or other facility to
11 customers to modify any aspect of the functioning described in the claim chart of the
12 Accused MoCA Instrumentalities while deployed to customer premises.

13 434. ~~262.~~ The Accused MoCA Instrumentalities are compliant with MoCA
14 1.0, 1.1., and/or 2.0, as described in the '7,566 Patent claim chart, Exhibit L.

15 ///

16 ///

17 435. ~~263.~~ DIRECTV therefore directly infringes at least claim 11 of the
18 '7,566 Patent by using the Accused MoCA Instrumentalities to provide Accused
19 Services to customers.

20 436. ~~264.~~ DIRECTV directly infringes at least claim 11 of the '7,566 Patent
21 when it, for example, uses the Accused MoCA Instrumentalities to test, demonstrate
22 or otherwise provide Accused Services and/or the Accused MoCA Instrumentalities.

23 437. ~~265.~~ DIRECTV directly infringes at least claim 11 of the '7,566 Patent
24 by making, importing, selling, and/or offering for sale the Accused MoCA
25 Instrumentalities, which meet every ~~limitation~~element of at least claim 11 of the
26 '7,566 Patent, in connection with providing the Accused Services over an
27 on-premises coaxial cable network.

1 438. ~~266.~~ DIRECTV had knowledge of the '7,566 Patent no later than its
2 receipt of Entropic's communications sent to DIRECTV on March 9, 2022.

3 439. ~~267.~~ DIRECTV has been aware that it infringes the '7,566 Patent no
4 later than its receipt of Entropic's communication sent to DIRECTV on March 9,
5 2022.

6 440. ~~268.~~ DIRECTV has known of or has been willfully blind to the '7,566
7 Patent since before the March 9, 2022 communications from Entropic.

8 441. ~~269.~~ The '7,566 Patent issued while or before DIRECTV was a member
9 of MoCA.

10 442. ~~270.~~ Because of DIRECTV's knowledge of Entropic Inc.'s work and
11 contributions related to MoCA technology, DIRECTV had knowledge of the '7,566
12 Patent before March 9, 2022 or was willfully blind to its existence.

13 443. ~~271.~~ DIRECTV has been aware of its infringement of the '7,566 Patent
14 no later than February 17, 2023 when Entropic sent DIRECTV claim charts detailing
15 the infringement of the '7,566 Patent by MoCA technology, which is deployed by
16 DIRECTV. The claim charts DIRECTV received approximately three months before
17 the filing of this Complaint show that the claims of the '7,566 Patent are essential to
18 practicing at least MoCA standards versions 1.0, 1.1, and/or 2.0.

19 444. ~~272.~~ The claims of the '7,566 Patent are essential to practicing at least
20 MoCA standards versions 1.0, 1.1, and/or 2.0.

21 445. ~~273.~~ DIRECTV knew, or was willfully blind to the fact that the
22 technology of the '7,566 Patent directly relates to networking over coaxial cable,
23 including MoCA, at least as early as DIRECTV became aware of the existence of the
24 '7,566 Patent. Because of its familiarity with, and access to, the MoCA standards,
25 DIRECTV knew, or was willfully blind to the fact, that use (by DIRECTV or its
26 customers) of instrumentalities compliant with MoCA 1.0, 1.1, and/or 2.0 to deliver
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1 DIRECTV services would necessarily infringe one or more claims of the '7,566
2 Patent.

3 446. ~~274.~~ Since learning of the '7,566 Patent and its infringing activities,
4 DIRECTV has failed to cease its infringing activities.

5 447. ~~275.~~ DIRECTV's customers and subscribers directly infringe at least
6 claim 11 of the '7,566 Patent by using the Accused MoCA Instrumentalities in
7 connection with the Accused Services provided by DIRECTV.

8 448. ~~276.~~ DIRECTV actively induces its customers' and subscribers' direct
9 infringement by providing the Accused Services through the Accused MoCA
10 Instrumentalities, and associated support.

11 449. ~~277.~~ For example, DIRECTV actively induces infringement of at least
12 claim 11 of the '7,566 Patent by providing the Accused MoCA Instrumentalities to
13 DIRECTV customers with specific instructions and/or assistance (including
14 installation and maintenance) regarding the instantiation of a MoCA network and the
15 use of the Accused MoCA Instrumentalities to infringe the '7,566 Patent.

16 450. ~~278.~~ DIRECTV aids, instructs, supports, and otherwise acts with the
17 intent to cause an end user to make and/or use the MoCA network and/or use the
18 Accused MoCA Instrumentalities to infringe every element of at least claim 11 of the
19 '7,566 Patent.

20 ///

21 451. ~~279.~~ Additionally, DIRECTV contributes to the customers' and
22 subscribers' direct infringement. DIRECTV provides, *inter alia*, the Accused MoCA
23 Instrumentalities designed and configured to create a MoCA network and operate as
24 nodes in the network, the use of which infringes at least claim 11 of the '7,566 Patent.

25 452. ~~280.~~ The Accused MoCA Instrumentalities have no substantial
26 noninfringing uses. When an end user uses the Accused MoCA Instrumentalities in
27 connection with the Accused Services provided by DIRECTV, the end user directly
28

1 infringes at least claim 11 of the '7,566 Patent. The Accused MoCA Instrumentalities
2 are therefore especially made or especially adapted for use in an infringing manner.

3 453. ~~281.~~ DIRECTV's inducement of, and contribution to, the direct
4 infringement of at least claim 11 of the '7,566 Patent has been, and is, continuous
5 and ongoing through the acts described above in connection with DIRECTV's
6 provision of the Accused Services.

7 454. ~~282.~~ DIRECTV's infringement of the '7,566 Patent is, has been, and
8 continues to be willful, intentional, deliberate, and/or in conscious disregard for
9 Entropic's rights under the patent.

10 455. ~~283.~~ Entropic has been damaged as a result of the infringing conduct
11 alleged above. DIRECTV is liable to Entropic in an amount that compensates
12 Entropic for DIRECTV's infringement, which by law cannot be less than a
13 reasonable royalty, together with interest and costs as fixed by this Court under 35
14 U.S.C. § 284.

15 456. ~~284.~~ Entropic is aware of no obligation to mark any instrumentality with
16 the '7,566 Patent in accordance with 35 U.S.C. § 287.

17 **COUNT VII**

18 **(Infringement of the '539 Patent)**

19 457. ~~285.~~ Entropic incorporates by reference each allegation of Paragraphs 1
20 through 284.

21 ///

22 ///

23 458. ~~286.~~ The '539 Patent duly issued on December 31, 2013 from an
24 application filed September 29, 2005 and, *inter alia*, a provisional application filed
25 December 2, 2004.

1 459. ~~287.~~ Entropic owns all substantial rights, interest, and title in and to the
2 '539 Patent, including the sole and exclusive right to prosecute this action and enforce
3 the '539 Patent against infringers, and to collect damages for all relevant times.

4 460. ~~288.~~ The '539 Patent is ~~one of the Link Maintenance Patents, and is~~
5 generally directed to, *inter alia*, a physical layer transmitter that performs all of the
6 necessary RF, analog and digital processing required for transmitting MAC messages
7 between devices in a broadband cable network. '539 Patent, col. 4, lines 37–48. The
8 '539 Patent has seven claims, of which claim 1 is independent. At least this claim of
9 the '539 Patent is directed at a variety of techniques for monitoring and maintaining
10 utilized modulation profiles in the MoCA network. A true and accurate copy of the
11 '539 Patent is attached hereto as Exhibit M.

12 461. ~~289.~~ The '539 Patent is directed to patent-eligible subject matter
13 pursuant to 35 U.S.C. § 101.

14 462. ~~290.~~ The '539 Patent is valid and enforceable, and presumed as such,
15 pursuant to 35 U.S.C. § 282.

16 463. ~~291.~~ DIRECTV deploys one or more of the Accused MoCA
17 Instrumentalities (e.g., DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV
18 C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44,
19 DIRECTV HR54, and DIRECTV HS17) in connection with operating and providing
20 the Accused Services.

21 464. ~~292.~~ The Accused MoCA Instrumentalities deployed by DIRECTV to
22 customer premises remain the property of DIRECTV while deployed.

23 465. ~~293.~~ The Accused MoCA Instrumentalities operate while deployed in a
24 manner controlled and intended by DIRECTV.

25 466. ~~294.~~ As set forth in the attached non-limiting claim chart (Exhibit N),
26 any product or system operating in a MoCA network compliant with the charted
27
28

1 provisions of MoCA 1.0, 1.1, and/or 2.0 necessarily infringes at least claim 1 of the
2 '539 Patent.

3 467. ~~295.~~ Each aspect of the functioning of the Accused MoCA
4 Instrumentalities described in the claim chart operates while deployed to customer
5 premises in a manner controlled and intended by DIRECTV.

6 468. ~~296.~~ DIRECTV provides no software, support or other facility to
7 customers to modify any aspect of the functioning described in the claim chart of the
8 Accused MoCA Instrumentalities while deployed to customer premises.

9 469. ~~297.~~ The Accused MoCA Instrumentalities are compliant with MoCA
10 1.0, 1.1., and/or MoCA 2.0, as described in the '539 Patent claim chart, Exhibit N.

11 470. ~~298.~~ DIRECTV therefore directly infringes at least claim 1 of the '539
12 Patent by using the Accused MoCA Instrumentalities to provide Accused Services to
13 customers.

14 471. ~~299.~~ DIRECTV directly infringes at least claim 1 of the '539 Patent
15 when it, for example, uses the Accused MoCA Instrumentalities to test, demonstrate
16 or otherwise provide Accused Services.

17 472. ~~300.~~ DIRECTV directly infringes at least claim 1 of the '539 Patent by
18 making, importing, selling, and/or offering for sale the Accused MoCA
19 Instrumentalities, which meet every ~~limitation~~element of at least claim 1 of the '539
20 Patent, in connection with providing the Accused Services over an on-premises
21 coaxial cable network.

22 473. ~~301.~~ DIRECTV had knowledge of the '539 Patent no later than its
23 receipt of Entropic's communications sent to DIRECTV on March 9, 2022.

24 474. ~~302.~~ DIRECTV has been aware that it infringes the '539 Patent no later
25 than its receipt of Entropic's communication sent to DIRECTV on March 9, 2022.

26 475. ~~303.~~ DIRECTV has known of or has been willfully blind to the '539
27 Patent since before the March 9, 2022 communications from Entropic.

1 ///

2 476. ~~304.~~ The '539 Patent issued while or before DIRECTV was a member
3 of MoCA.

4 477. ~~305.~~ Because of DIRECTV's knowledge of Entropic Inc.'s work and
5 contributions related to MoCA technology, DIRECTV had knowledge of the '539
6 Patent before March 9, 2022 or was willfully blind to its existence.

7 478. ~~306.~~ DIRECTV has been aware of its infringement of the '539 Patent
8 no later than February 17, 2023 when Entropic sent DIRECTV claim charts detailing
9 the infringement of the '539 Patent by MoCA technology, which is deployed by
10 DIRECTV. The claim charts DIRECTV received approximately three months before
11 the filing of this Complaint show that the claims of the '539 Patent are essential to
12 practicing at least MoCA standards versions 1.0, 1.1, and/or 2.0.

13 479. ~~307.~~ The claims of the '539 Patent are essential to practicing at least
14 MoCA standards versions 1.0, 1.1, and/or 2.0.

15 480. ~~308.~~ DIRECTV knew, or was willfully blind to the fact that the
16 technology of the '539 Patent directly relates to networking over coaxial cable,
17 including MoCA, at least as early as DIRECTV became aware of the existence of the
18 '539 Patent. Because of its familiarity with, and access to, the MoCA standards,
19 DIRECTV knew, or was willfully blind to the fact, that use (by DIRECTV or its
20 customers) of instrumentalities compliant with MoCA 1.0, 1.1, and/or 2.0 to deliver
21 DIRECTV services would necessarily infringe one or more claims of the '539 Patent.

22 481. ~~309.~~ Since learning of the '539 Patent and its infringing activities,
23 DIRECTV has failed to cease its infringing activities.

24 482. ~~310.~~ DIRECTV's customers and subscribers directly infringe at least
25 claim 1 of the '539 Patent by using the Accused MoCA Instrumentalities in
26 connection with the Accused Services provided by DIRECTV.

1 483. ~~311.~~ DIRECTV actively induces its customers' and subscribers' direct
2 infringement by providing the Accused Services through the Accused MoCA
3 Instrumentalities, and associated support.

4 484. ~~312.~~ For example, DIRECTV actively induces infringement of at least
5 claim 1 of the '539 Patent by providing the Accused MoCA Instrumentalities to
6 DIRECTV customers with specific instructions and/or assistance (including
7 installation and maintenance) regarding the instantiation of a MoCA network and the
8 use of the Accused MoCA Instrumentalities to infringe the '539 Patent.

9 485. ~~313.~~ DIRECTV aids, instructs, supports, and otherwise acts with the
10 intent to cause an end user to make and/or use the MoCA network and/or use the
11 Accused MoCA Instrumentalities to infringe every element of at least claim 1 of the
12 '539 Patent.

13 486. ~~314.~~ Additionally, DIRECTV contributes to the customers' and
14 subscribers' direct infringement. DIRECTV provides, *inter alia*, the Accused MoCA
15 Instrumentalities designed and configured to create a MoCA network and operate as
16 nodes in the network, the use of which infringes at least claim 1 of the '539 Patent.

17 487. ~~315.~~ The Accused MoCA Instrumentalities have no substantial
18 noninfringing uses. When an end user uses the Accused MoCA Instrumentalities in
19 connection with the Accused Services provided by DIRECTV, the end user directly
20 infringes at least claim 1 of the '539 Patent. The Accused MoCA Instrumentalities
21 are therefore especially made or especially adapted for use in an infringing manner.

22 488. ~~316.~~ DIRECTV's inducement of, and contribution to, the direct
23 infringement of at least claim 1 of the '539 Patent has been, and is, continuous and
24 ongoing through the acts described above in connection with DIRECTV's provision
25 of the Accused Services.

4 490. ~~318.~~ Entropic has been damaged as a result of the infringing conduct
5 alleged above. DIRECTV is liable to Entropic in an amount that compensates
6 Entropic for DIRECTV's infringement, which by law cannot be less than a
7 reasonable royalty, together with interest and costs as fixed by this Court under 35
8 U.S.C. § 284.

9 491. ~~319.~~ Entropic is aware of no obligation to mark any instrumentality with
10 the '539 Patent in accordance with 35 U.S.C. § 287.

COUNT VIII

(Infringement of the '213 Patent)

13 492. ~~320.~~ Entropic incorporates by reference each allegation of Paragraphs 1
14 through 319.

15 493. ~~321.~~ The '213 Patent duly issued on December 5, 2017 from an
16 application filed February 6, 2008, and, *inter alia*, a provisional application filed on
17 February 6 2007.

18 494. ~~322.~~ Entropic owns all substantial rights, interest, and title in and to the
19 '213 Patent, including the sole and exclusive right to prosecute this action and enforce
20 the '213 Patent against infringers, and to collect damages for all relevant times.

495. ~~323.~~ The '213 Patent is ~~one of the PQoS Flows Patents, and is~~ generally directed to, *inter alia*, low-cost and high-speed management of resources within a network in order to secure the capability to distribute multimedia data (such as video/audio, games, images, generic data, and interactive services) between devices within existing on-premises coaxial cable networks. '213 Patent, col. 3, lines 46–53. The '213 Patent has 24 claims, of which claims 1, 13, and 23 are independent. At least these claims of the '213 Patent are directed to a variety of techniques for

1 allocating resources for guaranteed quality of service flows in the MoCA network. A
2 true and accurate copy of the '213 Patent is attached hereto as Exhibit O.

3 496. ~~324.~~ The '213 Patent is directed to patent-eligible subject matter
4 pursuant to 35 U.S.C. § 101.

5 497. ~~325.~~ The '213 Patent is valid and enforceable, and presumed as such,
6 pursuant to 35 U.S.C. § 282.

7 ///

8 498. ~~326.~~ DIRECTV deploys one or more of the Accused MoCA
9 Instrumentalities (e.g., DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV
10 C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44,
11 DIRECTV HR54, and DIRECTV HS17) in connection with operating and providing
12 the Accused Services.

13 499. ~~327.~~ The Accused MoCA Instrumentalities deployed by DIRECTV to
14 customer premises remain the property of DIRECTV while deployed.

15 500. ~~328.~~ The Accused MoCA Instrumentalities operate while deployed in a
16 manner controlled and intended by DIRECTV.

17 501. ~~329.~~ As set forth in the attached non-limiting claim chart (Exhibit P),
18 any product or system operating in a MoCA network compliant with the charted
19 provisions of MoCA 1.1, or 2.0 necessarily infringes at least claim 1 of the '213
20 Patent.

21 502. ~~330.~~ Each aspect of the functioning of the Accused MoCA
22 Instrumentalities described in the claim chart operates while deployed to customer
23 premises in a manner controlled and intended by DIRECTV.

24 503. ~~331.~~ DIRECTV provides no software, support or other facility to
25 customers to modify any aspect of the functioning described in the claim chart of the
26 Accused MoCA Instrumentalities while deployed to customer premises.

1 504. ~~332.~~ The Accused MoCA Instrumentalities are compliant with MoCA
2 1.1 and/or MoCA 2.0, as described in the '213 Patent claim chart, Exhibit P.

3 505. ~~333.~~ DIRECTV therefore directly infringes at least claim 1 of the '213
4 Patent by using the Accused MoCA Instrumentalities to provide Accused Services to
5 customers.

6 506. ~~334.~~ DIRECTV sells the Accused Services to its customers and
7 subscribers for a fee. Pursuant to the sale of these services, DIRECTV uses the
8 method recited in at least claim 1 of the '213 Patent to provide the Accused Services
9 to DIRECTV's customers and subscribers through the Accused MoCA
10 Instrumentalities. DIRECTV is therefore engaging in the infringing use of at least
11 claim 1 of the '213 Patent in order to generate revenue from its customers and
12 subscribers.

13 507. ~~335.~~ DIRECTV directly infringes at least claim 1 of the '213 Patent
14 when it, for example, uses the Accused MoCA Instrumentalities to test, demonstrate
15 or otherwise provide Accused Services.

16 508. ~~336.~~ DIRECTV had knowledge of the '213 Patent no later than its
17 receipt of Entropic's communications sent to DIRECTV on March 9, 2022.

18 509. ~~337.~~ DIRECTV has been aware that it infringes the '213 Patent no later
19 than its receipt of Entropic's communications sent to DIRECTV on March 9, 2022.

20 510. ~~338.~~ DIRECTV has known of or has been willfully blind to the '213
21 Patent since before the March 9, 2022 communications from Entropic.

22 511. ~~339.~~ The '213 Patent issued while or before DIRECTV was a member
23 of MoCA.

24 512. ~~340.~~ Because of DIRECTV's knowledge of Entropic Inc.'s work and
25 contributions related to MoCA technology, DIRECTV had knowledge of the '213
26 Patent before March 9, 2022 or was willfully blind to its existence.

1 513. ~~341.~~ DIRECTV has been aware of its infringement of the '213 Patent
2 no later than February 17, 2023 when Entropic sent DIRECTV claim charts detailing
3 the infringement of the '213 Patent by MoCA technology, which is deployed by
4 DIRECTV. The claim charts DIRECTV received approximately three months before
5 the filing of this Complaint show that the claims of the '213 Patent are essential to
6 practicing at least MoCA standards versions 1.1, and/or 2.0.

7 514. ~~342.~~ The claims of the '213 Patent are essential to practicing at least
8 MoCA standards versions 1.1, and/or 2.0.

9 515. ~~343.~~ DIRECTV knew, or was willfully blind to the fact that the
10 technology of the '213 Patent directly relates to networking over coaxial cable,
11 including MoCA, at least as early as DIRECTV became aware of the existence of the
12 '213 Patent. Because of its familiarity with, and access to, the MoCA standards,
13 DIRECTV knew, or was willfully blind to the fact, that use (by DIRECTV or its
14 customers) of instrumentalities compliant with MoCA 1.1, and/or 2.0 to deliver
15 DIRECTV services would necessarily infringe one or more claims of the '213 Patent.

16 516. ~~344.~~ Since learning of the '213 Patent and its infringing activities,
17 DIRECTV has failed to cease its infringing activities.

18 517. ~~345.~~ DIRECTV's customers and subscribers directly infringe at least
19 claim 1 of the '213 Patent by using the Accused MoCA Instrumentalities in
20 connection with the Accused Services provided by DIRECTV.

21 518. ~~346.~~ DIRECTV actively induces its customers' and subscribers' direct
22 infringement by providing the Accused Services and associated support.

23 519. ~~347.~~ For example, DIRECTV actively induces infringement of at least
24 claim 1 of the '213 Patent by providing the Accused MoCA Instrumentalities to
25 DIRECTV customers with specific instructions and/or assistance (including
26 installation and maintenance) regarding the instantiation of a MoCA network and the
27 use of the Accused MoCA Instrumentalities to infringe the '213 Patent.

1 520. ~~348.~~ DIRECTV aids, instructs, supports, and otherwise acts with the
2 intent to cause an end user to make and/or use the MoCA network and/or use the
3 Accused MoCA Instrumentalities to infringe every element of at least claim 1 of the
4 '213 Patent.

5 521. ~~349.~~ Additionally, DIRECTV contributes to the customers' and
6 subscribers' direct infringement. DIRECTV provides at least the Accused MoCA
7 Instrumentalities that create and are at least substantially all of a MoCA network to
8 be used to infringe at least claim 1 of the '213 Patent.

9 522. ~~350.~~ The Accused MoCA Instrumentalities have no substantial
10 noninfringing uses. When an end user uses the Accused MoCA Instrumentalities in
11 connection with the Accused Services provided by DIRECTV, the end user directly
12 infringes at least claim 1 of the '213 Patent. The Accused MoCA Instrumentalities
13 are therefore especially made or especially adapted for use in an infringing manner.

14 523. ~~351.~~ DIRECTV's inducement of, and contribution to, the direct
15 infringement of at least claim 1 of the '213 Patent has been, and is, continuous and
16 ongoing through the acts described above in connection with DIRECTV's provision
17 of the Accused Services.

18 524. ~~352.~~ DIRECTV's infringement of the '213 Patent is, has been, and
19 continues to be willful, intentional, deliberate, and/or in conscious disregard for
20 Entropic's rights under the patent.

21 525. ~~353.~~ Entropic has been damaged as a result of the infringing conduct
22 alleged above. DIRECTV is liable to Entropic in an amount that compensates
23 Entropic for DIRECTV's infringement, which by law cannot be less than a
24 reasonable royalty, together with interest and costs as fixed by this Court under 35
25 U.S.C. § 284.

26 526. ~~354.~~ Upon information and belief, there is no duty to mark any
27 instrumentality with the '213 Patent in accordance with 35 U.S.C. § 287(a).
28

COUNT IX

(Infringement of the '422 Patent)

527. ~~355.~~ Entropic incorporates by reference each allegation of Paragraphs 1 through 354.

528. ~~356.~~ The '422 Patent duly issued on October 1, 2019 from an application filed December 5, 2017, an application filed February 6, 2008, and, *inter alia*, a provisional application filed February 6, 2007.

529. ~~357.~~ Entropic owns all substantial rights, interest, and title in and to the '422 Patent, including the sole and exclusive right to prosecute this action and enforce the '422 Patent against infringers, and to collect damages for all relevant times.

530. ~~358.~~ The '422 Patent is ~~one of the PQoS Flows Patents, and is~~ generally directed to, *inter alia*, low-cost and high-speed management of resources within a network in order to secure the capability to distribute multimedia data (such as video/audio, games, images, generic data, and interactive services) between devices within existing on-premises coaxial cable networks. '422 Patent, col. 3, lines 53–60. The '422 Patent has 20 claims, of which, claims 1, 5, 12–17 are independent. At least these claims of the '422 Patent are directed to a variety of techniques for allocating resources for guaranteed quality of service flows in the MoCA network. A true and accurate copy of the '422 Patent is attached hereto as Exhibit Q.

531. ~~359.~~ The '422 Patent is directed to patent-eligible subject matter pursuant to 35 U.S.C. § 101.

532. ~~360.~~ The '422 Patent is valid and enforceable, and presumed as such, pursuant to 35 U.S.C. § 282.

533. ~~361.~~ DIRECTV deploys one or more of the Accused MoCA Instrumentalities (e.g., DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44,

1 DIRECTV HR54, and DIRECTV HS17) in connection with operating and providing
2 the Accused Services.

3 534. ~~362.~~ The Accused MoCA Instrumentalities deployed by DIRECTV to
4 customer premises remain the property of DIRECTV while deployed.

5 535. ~~363.~~ The Accused MoCA Instrumentalities operate while deployed in a
6 manner controlled and intended by DIRECTV.

7 536. ~~364.~~ As set forth in the attached non-limiting claim chart (Exhibit R),
8 any product or system operating in a MoCA network compliant with the charted
9 provisions of MoCA 1.1, or 2.0 necessarily infringes at least claim 1 of the '422
10 Patent.

11 537. ~~365.~~ Each aspect of the functioning of the Accused MoCA
12 Instrumentalities described in the claim chart operates while deployed to customer
13 premises in a manner controlled and intended by DIRECTV.

14 538. ~~366.~~ DIRECTV provides no software, support or other facility to
15 customers to modify any aspect of the functioning described in the claim chart of the
16 Accused MoCA Instrumentalities while deployed to customer premises.

17 539. ~~367.~~ The Accused MoCA Instrumentalities are compliant with MoCA
18 1.1 and/or MoCA 2.0, as described in the '422 Patent claim chart, Exhibit R.

19 540. ~~368.~~ DIRECTV therefore directly infringes at least claim 1 of the '422
20 Patent by using the Accused MoCA Instrumentalities to provide Accused Services to
21 customers.

22 541. ~~369.~~ DIRECTV directly infringes at least claim 1 of the '422 Patent
23 when it, for example, uses the Accused MoCA Instrumentalities to test, demonstrate
24 or otherwise provide Accused Services.

25 542. ~~370.~~ DIRECTV directly infringes at least claim 1 of the '422 Patent by
26 making, importing, selling, and/or offering for sale the Accused MoCA
27 Instrumentalities in connection with providing the Accused Services over an
28

1 on-premises coaxial cable network, which meets every ~~limitation~~element of at least
2 claim 1 of the '422 Patent.

3 543. ~~371.~~ DIRECTV had knowledge of the '422 Patent no later than its
4 receipt of Entropic's communications sent to DIRECTV on March 9, 2022.

5 544. ~~372.~~ DIRECTV has been aware that it infringes the '422 Patent no later
6 than its receipt of Entropic's communication sent to DIRECTV on March 9, 2022.

7 545. ~~373.~~ DIRECTV has known of or has been willfully blind to the '422
8 Patent since before the March 9, 2022 communications from Entropic.

9 546. ~~374.~~ The '422 Patent issued while or before DIRECTV was a member
10 of MoCA.

11 547. ~~375.~~ Because of DIRECTV's knowledge of Entropic Inc.'s work and
12 contributions related to MoCA technology, DIRECTV had knowledge of the '422
13 Patent before March 9, 2022 or was willfully blind to its existence.

14 548. ~~376.~~ DIRECTV has been aware of its infringement of the '422 Patent
15 no later than February 17, 2023 when Entropic sent DIRECTV claim charts detailing
16 the infringement of the '422 Patent by MoCA technology, which is deployed by
17 DIRECTV. The claim charts DIRECTV received approximately three months before
18 the filing of this Complaint show that the claims of the '422 Patent are essential to
19 practicing at least MoCA standards versions 1.1, and/or 2.0.

20 549. ~~377.~~ The claims of the '422 Patent are essential to practicing at least
21 MoCA standards versions 1.1, and/or 2.0.

22 550. ~~378.~~ DIRECTV knew, or was willfully blind to the fact that the
23 technology of the '422 Patent directly relates to networking over coaxial cable,
24 including MoCA, at least as early as DIRECTV became aware of the existence of the
25 '422 Patent. Because of its familiarity with, and access to, the MoCA standards,
26 DIRECTV knew, or was willfully blind to the fact, that use (by DIRECTV or its
27
28

1 customers) of instrumentalities compliant with MoCA 1.1, and/or 2.0 to deliver
2 DIRECTV services would necessarily infringe one or more claims of the '422 Patent.

3 551. ~~379.~~ Since learning of the '422 Patent and its infringing activities,
4 DIRECTV has failed to cease its infringing activities.

5 552. ~~380.~~ DIRECTV's customers and subscribers directly infringe at least
6 claim 1 of the '422 Patent by using the Accused MoCA Instrumentalities in
7 connection with the Accused Services provided by DIRECTV.

8 553. ~~381.~~ DIRECTV actively induces its customers' and subscribers' direct
9 infringement by providing the Accused Services and associated support.

10 554. ~~382.~~ For example, DIRECTV actively induces infringement of at least
11 claim 1 of the '422 Patent by providing the Accused MoCA Instrumentalities to
12 DIRECTV customers with specific instructions and/or assistance (including
13 installation and maintenance) regarding the instantiation of a MoCA network and the
14 use of the Accused MoCA Instrumentalities to infringe the '422 Patent.

15 555. ~~383.~~ DIRECTV aids, instructs, supports, and otherwise acts with the
16 intent to cause an end user to make and/or use the MoCA network and/or use the
17 Accused MoCA Instrumentalities to infringe every element of at least claim 1 of the
18 '422 Patent.

19 556. ~~384.~~ Additionally, DIRECTV contributes to the customers' and
20 subscribers' direct infringement. DIRECTV provides at least the Accused MoCA
21 Instrumentalities that create and are at least substantially all of a MoCA network to
22 be used to infringe at least claim 1 of the '422 Patent.

23 557. ~~385.~~ The Accused MoCA Instrumentalities have no substantial
24 noninfringing uses. When an end user uses the Accused MoCA Instrumentalities in
25 connection with the Accused Services provided by DIRECTV, the end user directly
26 infringes at least claim 1 of the '422 Patent. The Accused MoCA Instrumentalities
27 are therefore especially made or especially adapted for use in an infringing manner.
28

1 565. ~~393.~~ The '910 Patent is the Packet Aggregation Patent, and it addresses
2 the problem in the prior art that “overhead admission is associated with each packet
3 transmitted through the network,” and such information, “including identifiers,
4 source and destination addresses, error control fields, etc., is added to the user data
5 and reduces the availability of network bandwidth for user data.” '910 Patent, col. 1,
6 lines 32-37. To address this problem the '910 Patent is generally directed to, *inter*
7 *alia*, transmitting data over a network, where the transmitting device aggregates
8 packets that are directed to a common destination node. This reduces the transmitted
9 packet overhead of the network by eliminating interframe gaps, preamble
10 information, and extra headers. '910 Patent, col. 1, line 66 – col. 2, line 3. The '910
11 Patent has three claims, all of which are independent. At least these claims of the
12 '910 Patent are directed to a variety of techniques for aggregating packet data units
13 in the MoCA network. A true and accurate copy of the '910 Patent is attached hereto
14 as Exhibit S.

15 566. ~~394.~~ The '910 Patent is directed to patent-eligible subject matter
16 pursuant to 35 U.S.C. § 101.

17 567. ~~395.~~ The '910 Patent is valid and enforceable, and presumed as such,
18 pursuant to 35 U.S.C. § 282.

19 568. ~~396.~~ DIRECTV deploys one or more of the Accused MoCA
20 Instrumentalities (e.g., DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV
21 C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44,
22 DIRECTV HR54, and DIRECTV HS17) in connection with operating and providing
23 the Accused Services.

24 ///

25 569. ~~397.~~ The Accused MoCA Instrumentalities deployed by DIRECTV to
26 customer premises remain the property of DIRECTV while deployed.

1 570. ~~398.~~ The Accused MoCA Instrumentalities operate while deployed in a
2 manner controlled and intended by DIRECTV.

3 571. ~~399.~~ As set forth in the attached non-limiting claim chart (Exhibit T),
4 any product or system operating in a MoCA network compliant with the charted
5 provisions of MoCA 1.1, or 2.0 necessarily infringes at least claim 3 of the '910
6 Patent.

7 572. ~~400.~~ Each aspect of the functioning of the Accused MoCA
8 Instrumentalities described in the claim chart operates while deployed to customer
9 premises in a manner controlled and intended by DIRECTV.

10 573. ~~401.~~ DIRECTV provides no software, support or other facility to
11 customers to modify any aspect of the functioning described in the claim chart of the
12 Accused MoCA Instrumentalities while deployed to customer premises.

13 574. ~~402.~~ The Accused MoCA Instrumentalities are compliant with MoCA
14 1.1., and/or MoCA 2.0, as described in the '910 Patent claim chart, Exhibit T.

15 575. ~~403.~~ DIRECTV therefore directly infringes at least claim 3 of the '910
16 Patent by using the Accused MoCA Instrumentalities to provide Accused Services to
17 customers.

18 576. ~~404.~~ DIRECTV directly infringes at least claim 3 of the '910 Patent
19 when it, for example, uses the Accused MoCA Instrumentalities to test, demonstrate
20 or otherwise provide Accused Services.

21 577. ~~405.~~ DIRECTV directly infringes at least claim 3 of the '910 Patent by
22 making, importing, selling, and/or offering for sale the Accused MoCA
23 Instrumentalities, which meet every ~~limitation~~element of at least claim 3 of the '910
24 Patent, in connection with providing the Accused Services over an on-premises
25 coaxial cable network.

26 ///

1 578. ~~406.~~ DIRECTV had knowledge of the '910 Patent no later than its
2 receipt of Entropic's communications sent to DIRECTV on March 9, 2022.

3 579. ~~407.~~ DIRECTV has been aware that it infringes the '910 Patent no later
4 than its receipt of Entropic's communication sent to DIRECTV on March 9, 2022.

5 580. ~~408.~~ DIRECTV has known of or has been willfully blind to the '910
6 Patent since before the March 9, 2022 communications from Entropic.

7 581. ~~409.~~ The '910 Patent issued while or before DIRECTV was a member
8 of MoCA.

9 582. ~~410.~~ Because of DIRECTV's knowledge of Entropic Inc.'s work and
10 contributions related to MoCA technology, DIRECTV had knowledge of the '910
11 Patent before March 9, 2022 or was willfully blind to its existence.

12 583. ~~411.~~ DIRECTV has been aware of its infringement of the '910 Patent
13 no later than February 17, 2023 when Entropic sent DIRECTV claim charts detailing
14 the infringement of the '910 Patent by MoCA technology, which is deployed by
15 DIRECTV. The claim charts DIRECTV received approximately three months before
16 the filing of this Complaint show that the claims of the '910 Patent are essential to
17 practicing at least MoCA standards versions 1.1, and/or 2.0.

18 584. ~~412.~~ The claims of the '910 Patent are essential to practicing at least
19 MoCA standards versions 1.1, and/or 2.0.

20 585. ~~413.~~ DIRECTV knew, or was willfully blind to the fact that the
21 technology of the '910 Patent directly relates to networking over coaxial cable,
22 including MoCA, at least as early as DIRECTV became aware of the existence of the
23 '910 Patent. Because of its familiarity with, and access to, the MoCA standards,
24 DIRECTV knew, or was willfully blind to the fact, that use (by DIRECTV or its
25 customers) of instrumentalities compliant with MoCA 1.1, and/or 2.0 to deliver
26 DIRECTV services would necessarily infringe one or more claims of the '910 Patent.

1 586. ~~414.~~ Since learning of the '910 Patent and its infringing activities,
2 DIRECTV has failed to cease its infringing activities.

3 587. ~~415.~~ DIRECTV's customers and subscribers directly infringe at least
4 claim 3 of the '910 Patent by using the Accused MoCA Instrumentalities in
5 connection with the Accused Services provided by DIRECTV.

6 588. ~~416.~~ DIRECTV actively induces its customers' and subscribers' direct
7 infringement by providing the Accused Services through the Accused MoCA
8 Instrumentalities, and associated support.

9 589. ~~417.~~ For example, DIRECTV actively induces infringement of at least
10 claim 3 of the '910 Patent by providing the Accused MoCA Instrumentalities to
11 DIRECTV customers with specific instructions and/or assistance (including
12 installation and maintenance) regarding the instantiation of a MoCA network and the
13 use of the Accused MoCA Instrumentalities to infringe the '910 Patent.

14 590. ~~418.~~ DIRECTV aids, instructs, supports, and otherwise acts with the
15 intent to cause an end user to make and/or use the MoCA network and/or use the
16 Accused MoCA Instrumentalities to infringe every element of at least claim 3 of the
17 '910 Patent.

18 591. ~~419.~~ Additionally, DIRECTV contributes to the customers' and
19 subscribers' direct infringement. DIRECTV provides, *inter alia*, the Accused MoCA
20 Instrumentalities designed and configured to create a MoCA network and operate as
21 nodes in the network, the use of which infringes at least claim 3 of the '910 Patent.

22 592. ~~420.~~ The Accused MoCA Instrumentalities have no substantial
23 noninfringing uses. When an end user uses the Accused MoCA Instrumentalities in
24 connection with the Accused Services provided by DIRECTV, the end user directly
25 infringes at least claim 3 of the '910 Patent. The Accused MoCA Instrumentalities
26 are therefore especially made or especially adapted for use in an infringing manner.

1 ~~orthogonal frequency divisional multiple access (OFDMA)~~ mode to a receiving
2 network device.” ’0,566 Patent, Abstract. The ’0,566 Patent has 18 claims, of which
3 claims 1, 7, 13, and 16 are independent. At least these claims of the ’0,566 Patent are
4 directed to a variety of techniques for assigning communication resources to one or
5 more nodes in the MoCA network. A true and accurate copy of the ’0,566 Patent is
6 attached hereto as Exhibit U.

7 ///

8 601. ~~429.~~ The ’0,566 Patent is directed to patent-eligible subject matter
9 pursuant to 35 U.S.C. § 101.

10 602. ~~430.~~ The ’0,566 Patent is valid and enforceable, and presumed as such,
11 pursuant to 35 U.S.C. § 282.

12 603. ~~431.~~ DIRECTV deploys one or more of the Accused MoCA
13 Instrumentalities (e.g., DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV
14 C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44,
15 DIRECTV HR54, and DIRECTV HS17) in connection with operating and providing
16 the Accused Services.

17 604. ~~432.~~ The Accused MoCA Instrumentalities deployed by DIRECTV to
18 customer premises remain the property of DIRECTV while deployed.

19 605. ~~433.~~ The Accused MoCA Instrumentalities operate while deployed in a
20 manner controlled and intended by DIRECTV.

21 606. ~~434.~~ As set forth in the attached non-limiting claim chart (Exhibit V),
22 any product or system operating in a MoCA network compliant with the charted
23 provisions of MoCA 2.0 necessarily infringes at least claim 1 of the ’0,566 Patent.

24 607. ~~435.~~ Each aspect of the functioning of the Accused MoCA
25 Instrumentalities described in the claim chart operates while deployed to customer
26 premises in a manner controlled and intended by DIRECTV.

1 608. ~~436.~~ DIRECTV provides no software, support or other facility to
2 customers to modify any aspect of the functioning described in the claim chart of the
3 Accused MoCA Instrumentalities while deployed to customer premises.

4 609. ~~437.~~ The Accused MoCA Instrumentalities are compliant with MoCA
5 2.0, as described in the '0,566 Patent claim chart, Exhibit V.

6 610. ~~438.~~ DIRECTV therefore directly infringes at least claim 1 of the '0,566
7 Patent by using the Accused MoCA Instrumentalities to provide Accused Services to
8 customers.

9 611. ~~439.~~ DIRECTV sells the Accused Services to its customers and
10 subscribers for a fee. Pursuant to the sale of these services, DIRECTV uses the
11 method recited in at least claim 1 of the '0,566 Patent to provide the Accused Services
12 to DIRECTV's customers and subscribers through the Accused MoCA
13 Instrumentalities. DIRECTV is therefore engaging in the infringing use of at least
14 claim 1 of the '0,566 Patent in order to generate revenue from its customers and
15 subscribers.

16 612. ~~440.~~ DIRECTV directly infringes at least claim 1 of the '0,566 Patent
17 when it, for example, uses the Accused MoCA Instrumentalities to test, demonstrate
18 or otherwise provide Accused Services.

19 613. ~~441.~~ DIRECTV had knowledge of the '0,566 Patent no later than its
20 receipt of Entropic's communications sent to DIRECTV on March 9, 2022.

21 614. ~~442.~~ DIRECTV has been aware that it infringes the '0,566 Patent no
22 later than its receipt of Entropic's communication sent to DIRECTV on March 9,
23 2022.

24 615. ~~443.~~ DIRECTV has known of or has been willfully blind to the '0,566
25 Patent since before the March 9, 2022 communications from Entropic.

26 616. ~~444.~~ The '0,566 Patent issued while or before DIRECTV was a member
27 of MoCA.
28

1 617. ~~445.~~ Because of DIRECTV's knowledge of Entropic Inc.'s work and
2 contributions related to MoCA technology, DIRECTV had knowledge of the '0,566
3 Patent before March 9, 2022 or was willfully blind to its existence.

4 618. ~~446.~~ DIRECTV has been aware of its infringement of the '0,566 Patent
5 no later than February 17, 2023 when Entropic sent DIRECTV claim charts detailing
6 the infringement of the '0,566 Patent by MoCA technology, which is deployed by
7 DIRECTV. The claim charts DIRECTV received approximately three months before
8 the filing of this Complaint show that the claims of the '0,566 Patent are essential to
9 practicing at least MoCA standards versions 1.1, and/or 2.0.

10 619. ~~447.~~ The claims of the '0,566 Patent are essential to practicing at least
11 MoCA standards versions 1.1, and/or 2.0.

12 620. ~~448.~~ DIRECTV knew, or was willfully blind to the fact that the
13 technology of the '0,566 Patent directly relates to networking over coaxial cable,
14 including MoCA, at least as early as DIRECTV became aware of the existence of the
15 '0,566 Patent. Because of its familiarity with, and access to, the MoCA standards,
16 DIRECTV knew, or was willfully blind to the fact, that use (by DIRECTV or its
17 customers) of instrumentalities compliant with MoCA 1.1, and/or 2.0 to deliver
18 DIRECTV services would necessarily infringe one or more claims of the '0,566
19 Patent.

20 621. ~~449.~~ Since learning of the '0,566 Patent and its infringing activities,
21 DIRECTV has failed to cease its infringing activities.

22 622. ~~450.~~ DIRECTV's customers and subscribers directly infringe at least
23 claim 1 of the '0,566 Patent by using the Accused MoCA Instrumentalities in
24 connection with the Accused Services provided by DIRECTV.

25 623. ~~451.~~ DIRECTV actively induces its customers' and subscribers' direct
26 infringement by providing the Accused Services and associated support.

1 624. ~~452.~~ For example, DIRECTV actively induces infringement of at least
2 claim 1 of the '0,566 Patent by providing the Accused MoCA Instrumentalities to
3 DIRECTV customers with specific instructions and/or assistance (including
4 installation and maintenance) regarding the instantiation of a MoCA network and the
5 use of the Accused MoCA Instrumentalities to infringe the '0,566 Patent.

6 625. ~~453.~~ DIRECTV aids, instructs, supports, and otherwise acts with the
7 intent to cause an end user to make and/or use the MoCA network and/or use the
8 Accused MoCA Instrumentalities to infringe every element of at least claim 1 of the
9 '0,566 Patent.

10 626. ~~454.~~ Additionally, DIRECTV contributes to the customers' and
11 subscribers' direct infringement. DIRECTV provides at least the Accused MoCA
12 Instrumentalities that create and are at least substantially all of a MoCA network to
13 be used to infringe at least claim 1 of the '0,566 Patent.

14 627. ~~455.~~ The Accused MoCA Instrumentalities have no substantial
15 noninfringing uses. When an end user uses the Accused MoCA Instrumentalities in
16 connection with the Accused Services provided by DIRECTV, the end user directly
17 infringes at least claim 1 of the '0,566 Patent. The Accused MoCA Instrumentalities
18 are therefore especially made or especially adapted for use in an infringing manner.

19 628. ~~456.~~ DIRECTV's inducement of, and contribution to, the direct
20 infringement of at least claim 1 of the '0,566 Patent has been, and is, continuous and
21 ongoing through the acts described above in connection with DIRECTV's provision
22 of the Accused Services.

23 629. ~~457.~~ DIRECTV's infringement of the '0,566 Patent is, has been, and
24 continues to be willful, intentional, deliberate, and/or in conscious disregard for
25 Entropic's rights under the patent.

26 630. ~~458.~~ Entropic has been damaged as a result of the infringing conduct
27 alleged above. DIRECTV is liable to Entropic in an amount that compensates
28

1 Entropic for DIRECTV's infringement, which by law cannot be less than a
2 reasonable royalty, together with interest and costs as fixed by this Court under 35
3 U.S.C. § 284.

4 631. ~~459.~~ Upon information and belief, there is no duty to mark any
5 instrumentality with the '0,566 Patent in accordance with 35 U.S.C. § 287(a).

6 **COUNT XII**

7 **(Infringement of the '681 Patent)**

8 632. ~~460.~~ Entropic incorporates by reference each allegation of Paragraphs 1
9 through 459.

10 633. ~~461.~~ The '681 Patent duly issued on January 29, 2013 from an
11 application filed October 15, 2009 and, *inter alia*, a provisional application filed
12 October 16, 2008.

13 634. ~~462.~~ Entropic owns all substantial rights, interest, and title in and to the
14 '681 Patent, including the sole and exclusive right to prosecute this action and enforce
15 the '681 Patent against infringers, and to collect damages for all relevant times.

16 635. ~~463.~~ The '681 Patent is ~~the Clock Sync Patent, and is~~ generally directed
17 to, *inter alia*, improving local clock time synchronization between a plurality of
18 nodes in a communication network. '681 Patent, Abstract. The '681 Patent has 40
19 claims, of which claims 1, 11, 21, and 31 are independent. At least these claims of
20 the '681 Patent are directed to a variety of techniques for clock synchronization for
21 nodes in the MoCA network. A true and accurate copy of the '681 Patent is attached
22 hereto as Exhibit W.

23 636. ~~464.~~ The '681 Patent is directed to patent-eligible subject matter
24 pursuant to 35 U.S.C. § 101.

25 637. ~~465.~~ The '681 Patent is valid and enforceable, and presumed as such,
26 pursuant to 35 U.S.C. § 282.

1 638. ~~466.~~ DIRECTV deploys one or more of the Accused MoCA
2 Instrumentalities- (e.g., DIRECTV C31, DIRECTV C41, DIRECTV C51, DIRECTV
3 C61, DIRECTV C61K, DIRECTV HR24, DIRECTV HR34, DIRECTV HR44,
4 DIRECTV HR54, and DIRECTV HS17) in connection with operating and providing
5 the Accused Services.

6 639. ~~467.~~ The Accused MoCA Instrumentalities deployed by DIRECTV to
7 customer premises remain the property of DIRECTV while deployed.

8 640. ~~468.~~ The Accused MoCA Instrumentalities operate while deployed in a
9 manner controlled and intended by DIRECTV.

10 641. ~~469.~~ As set forth in the attached non-limiting claim chart (Exhibit X),
11 any product or system operating in a MoCA network compliant with the charted
12 provisions of MoCA 2.0 necessarily infringes at least claim 1 of the '681 Patent.

13 642. ~~470.~~ Each aspect of the functioning of the Accused MoCA
14 Instrumentalities described in the claim chart operates while deployed to customer
15 premises in a manner controlled and intended by DIRECTV.

16 643. ~~471.~~ DIRECTV provides no software, support or other facility to
17 customers to modify any aspect of the functioning described in the claim chart of the
18 Accused MoCA Instrumentalities while deployed to customer premises.

19 644. ~~472.~~ The Accused MoCA Instrumentalities are compliant with MoCA
20 2.0 described in the '681 Patent claim chart, Exhibit X.

21 ///

22 645. ~~473.~~ DIRECTV therefore directly infringes at least claim 1 of the '681
23 Patent by using the Accused MoCA Instrumentalities to provide Accused Services to
24 customers.

25 646. ~~474.~~ DIRECTV sells the Accused Services to its customers and
26 subscribers for a fee. Pursuant to the sale of these services, DIRECTV uses the
27 method recited in at least claim 1 of the '681 Patent to provide the Accused Services
28

1 to DIRECTV's customers and subscribers through the Accused MoCA
2 Instrumentalities. DIRECTV is therefore engaging in the infringing use of at least
3 claim 1 of the '681 Patent in order to generate revenue from its customers and
4 subscribers.

5 647. ~~475.~~ DIRECTV directly infringes at least claim 1 of the '681 Patent
6 when it, for example, uses the Accused MoCA Instrumentalities to test, demonstrate
7 or otherwise provide Accused Services.

8 648. ~~476.~~ DIRECTV had knowledge of the '681 Patent no later than its
9 receipt of Entropic's communications sent to DIRECTV on August 9, 2022.

10 649. ~~477.~~ DIRECTV has been aware that it infringes the '681 Patent no later
11 than its receipt of Entropic's communication sent to DIRECTV on August 9, 2022.

12 650. ~~478.~~ DIRECTV has known of or has been willfully blind to the '681
13 Patent since before the August 9, 2022 communications from Entropic.

14 651. ~~479.~~ The '681 Patent issued while or before DIRECTV was a member
15 of MoCA.

16 652. ~~480.~~ Because of DIRECTV's knowledge of Entropic Inc.'s work and
17 contributions related to MoCA technology, DIRECTV had knowledge of the '681
18 Patent before August 9, 2022 or was willfully blind to its existence.

19 653. ~~481.~~ DIRECTV has been aware of its infringement of the '681 Patent
20 no later than February 17, 2023 when Entropic sent DIRECTV claim charts detailing
21 the infringement of the '681 Patent by MoCA technology, which is deployed by
22 DIRECTV. The claim charts DIRECTV received approximately three months before
23 the filing of this Complaint show that the claims of the '681 Patent are essential to
24 practicing at least MoCA standards versions 1.1, and/or 2.0.

25 654. ~~482.~~ The claims of the '681 Patent are essential to practicing at least
26 MoCA standards versions 1.1, and/or 2.0.

1 655. ~~483.~~ DIRECTV knew, or was willfully blind to the fact that the
2 technology of the '681 Patent directly relates to networking over coaxial cable,
3 including MoCA, at least as early as DIRECTV became aware of the existence of the
4 '681 Patent. Because of its familiarity with, and access to, the MoCA standards,
5 DIRECTV knew, or was willfully blind to the fact, that use (by DIRECTV or its
6 customers) of instrumentalities compliant with MoCA 1.1, and/or 2.0 to deliver
7 DIRECTV services would necessarily infringe one or more claims of the '681 Patent.

8 656. ~~484.~~ Since learning of the '681 Patent and its infringing activities,
9 DIRECTV has failed to cease its infringing activities.

10 657. ~~485.~~ DIRECTV's customers and subscribers directly infringe at least
11 claim 1 of the '681 Patent by using the Accused MoCA Instrumentalities in
12 connection with the Accused Services provided by DIRECTV.

13 658. ~~486.~~ DIRECTV actively induces its customers' and subscribers' direct
14 infringement by providing the Accused Services and associated support.

15 659. ~~487.~~ For example, DIRECTV actively induces infringement of at least
16 claim 1 of the '681 Patent by providing the Accused MoCA Instrumentalities to
17 DIRECTV customers with specific instructions and/or assistance (including
18 installation and maintenance) regarding the instantiation of a MoCA network and the
19 use of the Accused MoCA Instrumentalities to infringe the '681 Patent.

20 660. ~~488.~~ DIRECTV aids, instructs, supports, and otherwise acts with the
21 intent to cause an end user to make and/or use the MoCA network and/or use the
22 Accused MoCA Instrumentalities to infringe every element of at least claim 1 of the
23 '681 Patent.

24 ///

25 661. ~~489.~~ Additionally, DIRECTV contributes to the customers' and
26 subscribers' direct infringement. DIRECTV provides at least the Accused MoCA
27
28

1 Instrumentalities that create and are at least substantially all of a MoCA network to
2 be used to infringe at least claim 1 of the '681 Patent.

3 662. ~~490.~~—The Accused MoCA Instrumentalities have no substantial
4 noninfringing uses. When an end user uses the Accused MoCA Instrumentalities in
5 connection with the Accused Services provided by DIRECTV, the end user directly
6 infringes at least claim 1 of the '681 Patent. The Accused MoCA Instrumentalities
7 are therefore especially made or especially adapted for use in an infringing manner.

8 663. ~~491.~~—DIRECTV's inducement of, and contribution to, the direct
9 infringement of at least claim 1 of the '681 Patent has been, and is, continuous and
10 ongoing through the acts described above in connection with DIRECTV's provision
11 of the Accused Services.

12 664. ~~492.~~—DIRECTV's infringement of the '681 Patent is, has been, and
13 continues to be willful, intentional, deliberate, and/or in conscious disregard for
14 Entropic's rights under the patent.

15 665. ~~493.~~—Entropic has been damaged as a result of the infringing conduct
16 alleged above. DIRECTV is liable to Entropic in an amount that compensates
17 Entropic for DIRECTV's infringement, which by law cannot be less than a
18 reasonable royalty, together with interest and costs as fixed by this Court under 35
19 U.S.C. § 284.

20 666. ~~494.~~—Upon information and belief, there is no duty to mark any
21 instrumentality with the '681 Patent in accordance with 35 U.S.C. § 287(a).

22 **JURY DEMAND**

23 Entropic hereby requests a trial by jury on all issues so triable by right.

24 **PRAYER FOR RELIEF**

25 WHEREFORE, Entropic requests that:

26 A. The Court find that DIRECTV has directly infringed the Patents-in-Suit
27 and hold DIRECTV liable for such infringement;

1 B. The Court award damages pursuant to 35 U.S.C. § 284 adequate to
2 compensate Entropic for DIRECTV's past and future infringement of the Patents-in-
3 Suit, including both pre- and post-judgment interest and costs as fixed by the Court;

4 C. The Court increase any award to Entropic by a judicially appropriate
5 amount;

6 D. The Court declare that this is an exceptional case entitling Entropic to
7 its reasonable attorneys' fees under 35 U.S.C. § 285; and

8 E. The Court award such other relief as the Court may deem just and
9 proper.
10
11
12

13 Dated: ~~July 1~~November 7, 2023

Respectfully submitted,

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